



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

WIDENER LIBRARY



HX GNPY J

Sci 520.60



Harvard College Library

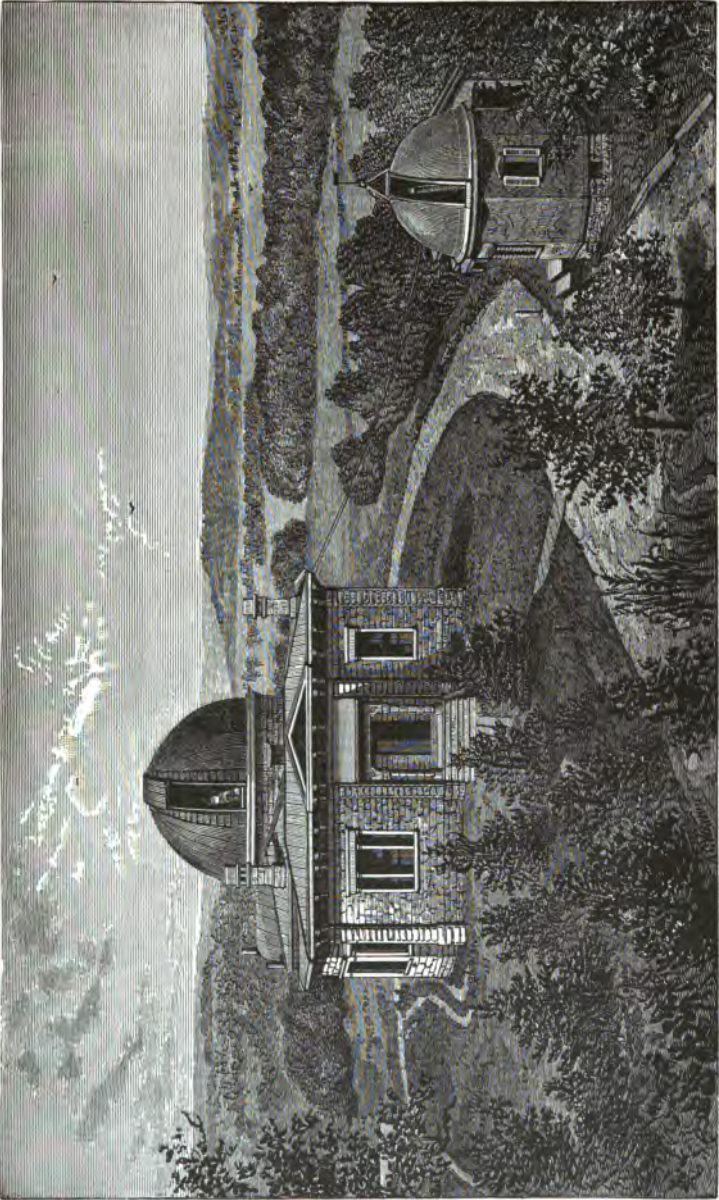
FROM

The Observatory.
10 May 1886.

SCIENCE CENTER LIBRARY







©

PUBLICATIONS

OF THE

—WASHBURN OBSERVATORY

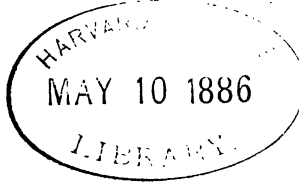
OF THE

—UNIVERSITY OF WISCONSIN. —

VOL. IV.

C
MADISON, WISCONSIN:
DEMOCRAT PRINTING COMPANY, STATE PRINTERS.
1886.

~~VI 3007~~
Sci 520.60



The Observatory

WASHBURN OBSERVATORY.

FOUNDED BY

CADWALLADER C. WASHBURN.

BORN 1818; DIED 1882.

EDWARD S. HOLDEN,	- - - - -	DIRECTOR.*
MILTON UPDEGRAFF,	}	ASSISTANT ASTRONOMERS.
ALICE M. LAMB,		
GEORGE W. BROWN (Student),	- - - - -	METEOROLOGICAL OBSERVER.
JOHN DOESCHER,	- - - - -	JANITOR.

*Resigned January 1, 1886.

TABLE OF CONTENTS.

	<i>Page.</i>
I. Introduction	1
II. Record of the Constants of the Meridian-Circle from 1885,	
January 1 to November 1	5
Position of the Circle	5
Record of Nadir-Points.....	6
Record of <i>a, b, c</i> , etc.....	16
Wire Intervals of the Glass Reticle	29
III. Remarks on the Observations and Reductions of the 303 Fun-	
damental Stars for the Southern Zones of the <i>Astrono-</i>	
<i>mische Gesellschaft</i> during 1884 and 1885 and of	
Miscellaneous Stars during the same period.....	31
Reduction of Observations in Right Ascension	32
Determination of the Azimuth Constant in Differential	
Right Ascension Observations	32
Reduction of Observations in Declination.....	33
Methods of Observation	38
Zenith-Distance Micrometer	41
Changes of the Equator-Point with Temperature.....	41
Refraction	42
Refraction Thermometer	42
Flexure.....	45-46
Probable Error of a single Right-Ascension	46
Probable Error of a single Declination.....	47
Relations between Observations Circle West and Circle	
East and between Observers E. S. H. and G. C. C.....	47
Observations with Screens for the purpose of Determin-	
ing the effect of the Magnitude of a Star on the time of	
its Transit	48
Effect of two Screens in reducing the Magnitudes of	
Stars	48
Observations through Screens.....	49
IV. Latitude of the Washburn Observatory.....	53
Latitude from Z. D. of <i>Polaris</i>	55
Probable errors of a single bisection of <i>Polaris</i> in 1884-	
1885	55

V. Determination of the Longitude of a point near the Western boundary of Dakota from Observations made by D. G. MAJOR, U. S. Astronomer and Surveyor, in the field, and by Professor EDWARD S. HOLDEN at the Washburn Observatory.....	62
Description of Stations, Instruments, etc.....	62
Personal Equation.....	63
Observations for Determining the Longitude.....	63
Final resulting Longitude	68
VI. Corrections to the Star-Catalogues contained in the Library of the Washburn Observatory.....	69
VII. Results of Meridian-Circle Observations in the years 1884 and 1885, at the Washburn Observatory.....	77
VIII. Meteorological Observations for the year 1885.....	189
IX. Summary of Meteorological Observations taken at Madison during the period 1853-1886.....	203
Appendix: Some Observations of the 303 Stars between 5 ^h and 12 ^h of Right Ascension	1*
Errata in Vol. IV	25*

WASHBURN OBSERVATORY.

I. INTRODUCTION.

In March, 1884, I offered on the part of the Washburn Observatory to observe the 303 fundamental stars for the southern zones of the *Astronomische Gesellschaft*.

On account of the small force at the Observatory, it was not possible to engage to make more than four complete observations *per* star. This offer was accepted by Professor AUWERS, who, at the same time, expressed a desire for six observations *per* star. It has been our endeavor to respond to Professor AUWERS' wish, and to obtain the six observations desired, as far as practicable. Work was begun May 2, 1884, and up to October 23, 1885, the following observations have been made by myself and Mr. COMSTOCK:

Stars of the 303 list.....	3,388
Other stars from the B. J.....	1,513
Stars of the Refraction List; Leyden, C. G. H. and Circumpolar	212
Stars of the Latitude List	107
Miscellaneous Stars (including <i>Polaris</i> for Latitude)	251
Total observations by E. S. H. and G. C. C.....	5,466

In this enumeration, each observed R. A. and each observed Dec. is counted once. Nadirs are not included.

Mr. UPDEGRAFF, assistant, began observations of the latitude stars in the summer of 1885, using B. J. stars as fundamental and including a few of the 303 stars in his list. The observations secured by Mr. UPDEGRAFF may be classified as follows:

Stars of the 303 list.....	20
Other stars from the B. J.....	81
Refraction Stars	5
Latitude Stars ..	133
Miscellaneous Stars (including <i>Polaris</i> for latitude).....	48
Total observations by M. U.....	287

Here again, each R. A. and each Dec. is counted as an observation.

From May 2, 1884, to October 23, 1885, there have then been made 5,753 observations of stars with the meridian circle.

Up to June 1, 1884, all the pointings at the telescope were made by myself. By the liberality of a friend of the Observatory,—O. H. INGRAM, Esq., of Eau Claire,—we were enabled to employ Mr. G. C. COMSTOCK, formerly assistant here, during the months June—September, 1884; and from September 1884 to June 1885, his services were secured by an appropriation from the BACHE fund of the National Academy of Sciences, which was put at our disposition by the Board of Directors of this Fund—Professors J. D. DANA, WOLCOTT GIBBS and J. E. HILGARD. These gentlemen have officially expressed their willingness that these observations should be published here, with this expression of our great indebtedness for the timely aid given by their appropriation from the Fund provided by the will of Professor A. D. BACHE.

In July 1885, Mr. COMSTOCK was appointed Professor of Astronomy at the State University of Ohio. His place in our work was taken by Mr. UPDEGRAFF, assistant.

The observations have been reduced according to the general plan suggested by Professor AUWERS, and in detail as our experience dictated, chiefly by Mr. COMSTOCK. Rev. F. H. BIGELOW, Professor of Astronomy at Racine College, Wisconsin, formerly of the National Observatory of the Argentine Republic, Cordoba, has made nearly all the reductions to mean place, and during the summer of 1885 he resided at the Observatory and was occupied with the R. A. reductions then in hand. Our thanks are especially due to him. Since June 1885, the reductions, especially in Declination, have been chiefly made by Mr. UPDEGRAFF. Mr. UPDEGRAFF has also observed a list of latitude stars for the U. S. Coast and Geodetic Survey, which is printed in this volume, as well as *Polaris* for latitude, and stars for the heliometer-zones of the German Transit of Venus Commission, as

well as a number of the 303 stars lying between 5^h and 11^h of right ascension.

In October 1885, I was appointed President of the University of California and Director of the Lick Observatory, and it became necessary to collect our work on the 303 stars and to print it in this volume in its state at that time. Fortunately our practice of keeping the reductions well up to the observations permitted this to be done. As far as the 303 stars are concerned, the work will not materially suffer. The observations cannot however receive so full a discussion as was proposed, and a number of interesting questions specially relating to absolute declinations must be left to my successor. Still, it is hoped that enough is here given to show the degree of confidence to which our *differential* observations are entitled. The 303 list has been practically completed from $0^h\ 0^m$ to $5^h\ 29^m$ and from $11^h\ 50^m$ to $24^h\ 0^m$, 3,403 observations of the 303 stars proper having been secured, and 5,753 observations in all having been made since May 1884. From $5^h\ 29^m$ to $11^h\ 50^m$, 468 observations are still required to complete the work on the basis of twelve observations per star. These will be difficult to obtain, as these hours of R. A. fall in our severe winter weather when for weeks together the thermometer at night does not rise above zero Fahrenheit. At this temperature our declination observations are not entirely satisfactory. Mr. UPDEGRAFF will endeavor to fill this vacancy as far as practicable under the circumstances, and his observations will be printed either as an appendix to this volume, or subsequently.

Even in its uncompleted state, it is hoped that our work may prove to be of value in the important international undertaking of the *Astronomische Gesellschaft*. We have spared no pains on our part, and my only regret is that I am obliged to print the mere results of observation instead of accompanying them with the thorough discussion which they seem to deserve. Under the circumstances this is impossible.

In severing my connection with the Washburn Observatory, where I have spent five happy years, I wish to again

call the attention of those into whose hands our Publications may come, to the fact that the entire Observatory, building, instruments and equipment, was the gift of Governor WASHBURN to his adopted state, and to express my sincere pleasure that I have been able to present a certain amount of conscientious work as an outcome of his enlightened and liberal views.

In doing this I have received every assistance from the Regents of the University, and especially from each member of the Observatory staff.

EDWARD S. HOLDEN.

October 23, 1885.

II. RECORD OF THE CONSTANTS OF THE MERIDIAN CIRCLE FROM 1885 JANUARY 1, TO 1885 NOVEMBER 1.

POSITION OF THE CIRCLE.

The Circle was West:

From 1884, Dec. 21, to 1885, Jan. 30.

1885, Feb. 17,	Feb. 25.
Mar. 12,	Mar. 23.
Apr. 5,	May 13.
May 24,	May 30.
June 23,	July 19.
Oct. 24.	

The Circle was East:

From 1885, Jan. 30, to 1885, Feb. 17.

Feb. 25,	Mar. 12.
Mar. 23,	Apr. 5.
May 13,	May 24.
June 1,	June 23.
July 19,	Oct. 24.

RECORD OF NADIR POINTS FROM 1885 JAN. 9, TO 1885, NOV. 1.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h		°		° ' "	
Jan. 9	0.9	W.	+26	U.	125 26 55.02	Book A begins.
9	1.8	W.	+27	U.	26 55.00	
12	0.9	W.	+ 9	U.	26 24.11	{ Ref. wire almost imperceptible.
12	1.7	W.	+ 7	U.	26 24.55	
13	0.9	W.	.....	L.	26 18.38	
13	1.7	W.	+27	L.	26 19.27	Ref. wire exceedingly faint.
17	0.9	W.	+ 4	U.	26 23.55	Ref. wire very bad.
18	0.8	W.	- 4	U.	26 21.73	Ref. wire very poor.
18	1.8	W.	- 2	U.	26 22.75	Ref. wire very poor.
24	0.8	W.	+18	U.	26 34.04	
Circle reversed.						
30	0.9	E.	.....	C.	125 32 51.06	
30	1.7	E.	.....	C.	32 49.46	
Feb. 3	.....	E.	+27	Hn.	32 43.17	
5	0.9	E.	.....	C.	32 44.14	
5	1.6	E.	.....	C.	32 44.93	
5	5.4	E.	+17	U.	32 45.42	
5	5.8	E.	.....	C.	32 44.76	
5	6.3	E.	.....	U.	32 45.83	
6	1.2	E.	.....	U.	32 44.06	
6	2.4	E.	.....	U.	32 44.08	
11	.....	E.	.....	C.	32 54.40	
11	.....	E.	.....	C.	32 53.93	
14	0.9	E.	+11	C.	32 51.02	
14	1.5	E.	.....	C.	32 50.85	
16	.....	E.	.....	C.	32 52.83	
16	.....	E.	.....	C.	32 52.83	

WASHBURN OBSERVATORY.

7

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h		c		° ' "	
Feb. 18	0.9	W.		C.	125 26 13.27	
18	1.5	W.		C.	26 13.69	
19	0.9	W.		C.	26 13.00	
19	1.5	W.		C.	26 13.57	
20	0.9	W.		C.	26 12.48	Rejected.
20	1.0	W.		C.	26 12.93	
20	1.6	W.		C.	26 13.21	
20	5.4	W.	+9	Hn.	26 14.78	
21	1.0	W.		C.	26 14.62	
21	1.6	W.		C.	26 14.20	
22	0.9	W.	+19	U.	26 14.62	
22	1.6	W.	+20	U.	26 15.03	
23	0.8	W.		C.	26 13.78	Shutters closed.
23	0.9	W.		C.	26 13.76	Shutters open'd
23	1.6	W.		C.	26 14.62	
25	23 ^h	Tightened		bolts	which hold inst. to	pier.
25	0.8	W.	+33	C.	26 11.96	
25	1.6	W.	+34	C.	26 11.93	Circle reversed
26	0.9	E.	+38	U.	125 32 34.59	
26	1.6	E.	+39	U.	32 34.53	
26	6.0	E.	+34	Hn.	32 33.48	
26	8.4	E.	+29	Hn.	32 32.58	
27	0.9	E.	+41	L.	32 35.34	
27	1.5	E.	+40	L.	32 35.59	
27	2.0	E.	+40	U.	32 35.29	
Mar. 4	2.6	E.		C.	32 33.18	
5	2.4	E.	+39°	C.	32 32.44	
5	2.5	E.	+39.6	C.	32 32.50	

RECORD OF NADIR POINTS — Continued.

Date.	Sid-time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885. Mar. 6	h. 3.1	E.	°	C.	° ' " 125 32 35.84	
7	7.8	E.	+27.5	C.	32 37.84	
7	9.0	E.	+18.0	C.	32 37.46	
8	7.7	E.	+31.	C.	32 38.47	
8	9.2	E.	+28.4	C.	32 37.94	
9	7.7	E.	.....	C.	32 45.62	
9	9.0	E.	.....	C.	32 45.48	
10	2.9	E.	.....	C.	32 46.76	
10	7.6	E.	+26.	C.	32 46.56	
10	9.0	E.	+21.8	C.	32 47.08	
11	7.7	F.	.....	C.	32 46.44	
11	9.3	E.	.....	C.	32 45.90	
14	2.3	W.	.....	C.	125 26 18.76	Circle reversed.
14	2.8	W.	.....	C.	26 18.78	
16	7.8	W.	+8	C.	26 16.21	
16	9.2	W.	+14	C.	26 18.56	
17	7.7	W.	.....	C.	26 18.98	Ref. image good.
18	.....	W.	.....	C.	26 45.89	
18	.....	.....	.....	.....	.....	Azimuth level & micro's adjus'd.
19	7.8	W.	.....	C.	125 27 0.61	Wire B used;
19	9.1	W.	.....	C.	27 1.48	Corr. applied.
20	4.6	W.	+17	C.	27 2.32	See book for remark.
20	7.8	W.	.....	C.	27 0.46	
20	9.0	W.	.....	C.	27 1.10	
21	7.2	W.	+16	Hn.	27 1.97	Poor; focus not good.
21	9.2	W.	+16	Hn.	27 2.61	
22	7.6	W.	.....	C.	27 2.84	Ref. wire poor.
22	9.2	W.	.....	C.	27 3.74	
						Circle reversed.

WASHBURN OBSERVATORY.

9

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h.		°		° ' "	
Mar. 24	7.8	E.	.....	C.	125 32 44.19	
24	9.0	E.	26	C.	32 44.68	
26	4.6	E.	.....	C.	33 43.27	Book B. begins.
28	7.5	E.	32	Hn.	32 42.46	Image fine.
28	9.9	E.	28	Hn.	32 42.64	
31	0.9	E.	48	U.	32 42.79	
31	1.6	E.	47	U.	32 42.79	
April 3	0.8	E.	35	U.	32 43.37	
3	1.6	E.	38	U.	32 42.93	
3	8.3	E.	38	Hn.	32 42.36	
3	10.3	E.	32	Hn.	32 42.54	
4	8.0	E.	40	Hn.	32 41.61	
4	10.2	E.	39.7	Hn.	32 41.81	
						Circle reversed.
5	8.0	W.	48	Hn.	125 26 34.24	
5	10.3	W.	44	Hn.	26 35.75	
6	0.8	W.	50	U.	26 34.32	
6	1.6	W.	52	U.	26 35.04	
7	0.9	W.	34	U.	26 36.03	
8	1.6	W.	36	U.	26 35.62	
12	0.8	W.	35	U.	26 35.24	
13	8.5	W.	38	Hn.	26 36.35	
13	10.3	W.	35	Hn.	26 37.78	
21	Micro	meter	wire	found	broken.	New threads put in April 25. Ref. wire very faint. Pretty good.
28	9.5	W.	49	Hn.	26 35.43	
28	12.2	W.	43	Hn.	26 36.29	
May 3	.....	.....	.....	.....	Microscopes V and	VII adjusted.
3	9.9	W.	52	Hn.	26 33.50	
4	9.9	W.	59	Hn.	26 33.79	Poor.

RECORD OF NADIR POINTS—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.			Remarks.
1885. May 4	h. 11.1	W.	61	Hn.	125	26	32.91	
9								Z. D. Mic. wire A found broken.
9	11.6	W.	44	C.	125	23	55.38	Wire B used.
10	10.6	W.	50	Hn.		23	54.22	
10	12.3	W.	.....	Hn.		23	54.60	
12	10.3	W.	57	Hn.		23	54.54	
14	5.9	E.	.....	C.	125	30	22.70	Circle reversed.
17								New Z. D. Mic. threads put in.
20	11.1	E.	59	C.	125	32	54.06	
21	11.4	E.	62	Hn.		32	55.07	Very poor.
21	12.3	E.	65	Hn.		32	55.27	Better than preceding.
21	14.7	E.	62	Hn.		32	54.72	Unsatisfactory.
22	12.3	E.	71	Hn.		32	54.90	
23	15.6	E.	63	Hn.		32	53.79	
23	14.1	E.	66	Hn.		32	54.07	
23	16.6	E.	62	Hn.		32	53.45	
								Circle reversed.
25	12.6	W.	68	Hn.	125	26	39.13	
25	14.9	W.	65	Hn.		26	40.81	
25	17.0	W.	62	Hn.		26	41.23	
30	16.7	W.	.....	C.		26	42.04	Excellent.
30	18.1	W.	62.2	C.		26	41.57	
30	19.1	W.	62.4	C.		26	41.20	
30	21.0	W.	.....	C.		26	41.06	
June 1								Circle reversed.
1	12.9	E.	71.4	C.	125	32	58.18	
1	13.5	E.	70	C.		32	57.75	Ref. wire faint.
1	14.6	E.	68.0	C.		32	57.39	Very faint.

RECORD OF NADIR POINTS — Continued.

Date.	Sid Time.	Circle.	Temp.	Obsr.	Nadir Point.			Remarks.
	h.		°		°	'	"	
1885 June 1	15 1	E.	66.0	C.	125	33	56.48	Wire very faint.
1	15.6	E.	64.7	C.		32	56.71	
1	16.0	E.	64.4	C.		32	56.04	
1	16.7	E.	62.6	C.		32	55.77	
1	17.3	E.	62.0	C.		32	56.22	
8	17.2	E.	54.	U.		32	58.01	
8	18.1	E.	55.	U.		32	57.28	
8	18.6	E.	54.	U.		32	57.59	
8	19.2	E.	53.	U.		32	58.05	
8	20.8	E.	53.	U.		32	58.18	Ref. wire extremely faint.
10	12.7	E.	67.	U.		32	56.61	
10	13.7	E.	66.	U.		32	56.68	
10	17.4	E.	60.	U.		32	54.91	Rather poor.
10	18.1	E.	59.	U.		32	55.39	Good.
10	18.5	E.	59.	U.		32	55.84	
10	19.1	E.	59.	U.		32	55.86	
10	20.9	E.	59.	U.		32	56.28	
13	16.7	E.	70.	C.		32	54.45	Wire faint and diffuse.
13	18.0	E.	69.3	C.		32	54.21	
13	19.1	E.	66.4	C.		32	54.89	Fair.
13	21.2	E.	65.7	C.		32	54.26	
18	16.9	E.	65.	U.		32	54.84	Railway train, rather poor.
18	18.1	E.	65.	U.		32	54.89	Railway train, rather poor.
18	18.5	E.	65.	U.		32	55.48	
18	19.1	E.	65.	U.		32	55.69	Good.
18	20.8	E.	64.	U.		32	55.43	
21	16.8	E.	60.6	C.		32	55.65	Fair.
21	18.1	E.	57.9	C.		32	54.67	

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885. May 4	h. 11.1	W.	61	Hn.	125 26 32.91	
9						Z. D. Mic. wire A found broken. Wire B used.
9	11.6	W.	44	C.	125 23 55.88	
10	10.6	W.	50	Hn.	23 54.22	
10	12.3	W.	.....	Hn.	23 54.60	
12	10.3	W.	57	Hn.	23 54.54	
14	5.9	E.	.....	C.	125 30 22.70	Circle reversed.
17						New Z. D. Mic. threads put in.
20	11.1	E.	59	C.	125 31 54.06	
21	11.4	E.	62	Hn.	32 55.07	Very poor.
21	12.3	E.	65	Hn.	32 55.27	Better than preceding.
21	14.7	E.	62	Hn.	32 54.72	Unsatisfactory.
22	12.3	E.	71	Hn.	32 54.90	
22	15.6	E.	63	Hn.	32 53.79	
23	14.1	E.	66	Hn.	32 54.07	
23	16.6	E.	62	Hn.	32 53.45	
						Circle reversed.
25	12.6	W.	68	Hn.	125 26 39.13	
25	14.9	W.	65	Hn.	26 40.81	
25	17.0	W.	62	Hn.	26 41.23	
30	16.7	W.	.....	C.	26 42.04	Excellent.
30	18.1	W.	62.2	C.	26 41.57	
30	19.1	W.	62.4	C.	26 41.20	
30	21.0	W.	.....	C.	26 41.06	
June 1						Circle reversed.
1	12.9	E.	71.4	C.	125 32 58.18	
1	13.5	E.	70	C.	32 57.75	Ref. wire faint.
1	14.6	E.	68.0	C.	32 57.39	Very faint.

RECORD OF NADIR POINTS — Continued.

Date.	Sid Time.	Circle.	Temp.	Obsr.	Nadir Point.			Remarks.
1885	h.		°		°	'	"	
June 1	15 1	E.	66.0	C.	125	33	56.48	Wire very faint.
1	15.6	E.	64.7	C.		32	56.71	
1	16.0	E.	64.4	C.		32	56.04	
1	16.7	E.	62.6	C.		32	55.77	
1	17.3	E.	62.0	C.		32	56.22	
8	17.2	E.	54.	U.		32	58.01	
8	18.1	E.	55.	U.		32	57.28	
8	18.6	E.	54.	U.		32	57.59	
8	19.2	E.	53.	U.		32	58.05	
8	20.8	E.	58.	U.		32	58.18	Ref. wire extremely faint.
10	12.7	E.	67.	U.		32	56.61	
10	13.7	E.	66.	U.		32	56.68	
10	17.4	E.	60.	U.		32	54.91	Rather poor.
10	18.1	E.	59.	U.		32	55.39	Good.
10	18.5	E.	59.	U.		32	55.84	
10	19.1	E.	59.	U.		32	55.86	
10	20.9	E.	59.	U.		32	56.28	
13	16.7	E.	70.	C.		32	54.45	Wire faint and diffuse.
13	18.0	E.	69.3	C.		32	54.21	
13	19.1	E.	66.4	C.		32	54.89	Fair.
13	21.2	E.	65.7	C.		32	54.26	
18	16.9	E.	65.	U.		32	54.84	Railway train, rather poor.
18	18.1	E.	65.	U.		32	54.89	Railway train, rather poor.
18	18.5	E.	65.	U.		32	55.48	
18	19.1	E.	65.	U.		32	55.69	Good.
18	20.8	E.	64.	U.		32	55.43	
21	16.8	E.	60.6	C.		32	55.65	Fair.
21	18.1	E.	57.9	C.		32	54.67	

RECORD OF NADIR POINTS.—Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1895. June 21	h. 18.6	E.	° 55.8	C.	° ' "	
	21	E.	57	C.	125 32 54.93	
	21	E.	54.5	C.	32 55.38	
	21	E.		C.	32 54.40	
						Circle reversed.
	25	W.	70.0	C.	125 26 43.40	Good wires.
	25	W.	69.5	C.	26 42.53	
	25	W.	68.5	C.	26 43.85	
	25	W.	69.0	C.	26 42.70	
	25	W.	68.4	C.	26 42.47	
	29	W.	59.5	C.	26 46.53	
	29	W.	57.6	C.	26 47.01	
	29	W.	56.7	C.	26 46.97	
	29	W.	57.7	C.	26 46.71	Wire faint and diffuse.
	29	W.	55.6	C.	26 50.34	
July 3	17.0	W.	72	U.	26 45.85	Ref. wire very faint.
	3	W.	69	U.	26 45.89	Good.
	3	W.	70	U.	26 45.69	
	3	W.	69	U.	26 45.78	
	{ 4	W.	76	U.	25 47.42	}
	{ 4	W.	76	U.	26 47.57	
	{ 5	W.	75	U.	26 47.00	}
	{ 6	W.	76	U.	26 46.73	
	{ 9	W.	74	U.	26 48.24	Wind; not very good.
	{ 9	W.	75	U.	26 48.42	Wind; poor.
	9	W.	68	U.	26 45.54	Good.
	9	W.	67	U.	26 45.52	
	9	W.	68	U.	26 46.17	
	9	W.	70	U.	26 46.84	Poor, wire faint, wind.

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h.		°		° ' "	
July 9	20.9	W.	67	U.	125 26 45.83	Wire extremely faint, very poor, wind.
10	12.9	W.	74	U.	26 48.79	
11	17.3	W.	66	U.	26 49.71	Good.
11	18.0	W.	66	U.	26 49.18	
11	18.6	W.	67	U.	26 48.40	Train, poor.
11	19.2	W.	65	U.	26 48.37	
11	20.2	W.	65	U.	26 48.45	Good.
12	13.0	W.	75	U.	[26 50.55]	Poor, reject.
12	13.6	W.	75	U.	26 50.10	Good.
13	12.8	W.	74	U.	26 49.44	
13	13.6	W.	73	U.	26 49.55	
13	17.1	W.	67	U.	26 46.97	Good.
13	18.1	W.	65	U.	26 47.62	Wire faint, poor.
13	18.5	W.	65	U.	26 47.71	Wire faint, poor.
13	19.1	W.	63	U.	25 47.33	Wire faint, poor.
13	20.8	W.	65	U.	26 47.63	Wire faint, poor.
14	20.6	W.	71	U.	26 47.39	
14	21.6	W.	70	U.	26 46.53	Pretty good.
15	19.9	W.	71	U.	26 47.97	Excellent.
15	21.3	W.	66	U.	26 48.06	Good.
						Circle reversed.
Aug. 10	20.0	E.	67	Hn.	125 32 49.44	
10	21.3	E.	66	Hn.	32 48.83	
26	12.8	E.	64	U.	32 56.98	
31	12.8	E.	67	U.	32 56.46	
Sept. 1	12.8	E.	63	U.	32 56.42	
1	18.6	E.	60	U.	32 56.00	
2	12.9	E.	63	U.	32 57.08	

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885. Sept. 3	h. 12.8	E.	° 61	U.	° ' " 125 32 56.64	
4	12.9	E.	63	U.	32 56.95	
5	12.8	E.	62	U.	32 58.46	
5	13.6	E.	62	U.	32 58.39	(East Alidade wrapped in listing.)
Oct. 5	12.9	E.	48	U.	32 57.26	
8	12.9	E.	54	U.	32 58.16	
9	12.9	E.	58	U.	32 57.24	
10	13.6	E.	60	U.	32 57.54	
11	0.7	E.	58	U.	32 55.92	Excellent.
11	1.6	E.	56	U.	32 55.98	Excellent.
11	13.0	E.	62	U.	32 56.78	Fair.
12	13.6	E.	62	U.	32 57.07	Very good.
12	1.8	E.	55	U.	32 55.25	
13	12.9	E.	63	U.	32 56.86	
14	13.7	E.	54	U.	32 56.67	End of Book C.
14	0.9	E.	50	U.	32 56.28	
14	1.6	E.	51	U.	32 56.20	
15	0.9	E.	58	U.	32 56.33	
15	1.6	E.	56	U.	32 56.15	
15	12.9	E.	61	U.	32 57.34	
15	13.6	E.	60	U.	32 57.32	
16	12.9	E.	58	U.	32 56.25	
16	13.6	E.	58	U.	32 56.22	
17	0.9	E.	49	U.	32 56.00	
17	1.7	E.	50	U.	32 55.99	
21	12.9	E.	46	U.	32 57.55	
21	13.6	E.	47	U.	32 57.42	Poor.

RECORD OF NADIR POINTS — Continued.

Date.	Sid-time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885. Oct. 22	h. 12.9	E.	° 47	U.	° ' " 125 32 57.28	Very poor.
22	13.6	E.	46	U.	32 57.87	Very poor.
23	0.9	E.	42	U.	32 56.44	Poor.
23	1.7	E.	45	U.	32 56.53	Poor.
24	0.9	E.	49	U.	32 56.56	
24	1.6	E.	50	U.	32 56.45	
24	12.9	E.	54	U.	32 56.67	
24	13.6	E.	55	U.	32 56.77	
Circle reversed.						
25	12.9	W.	57	U.	125 27 32.88	
25	13.7	W.	60	U.	27 32.99	
28	13.	.....	.....	.....	.....	Objective taken out & replaced
28	1.0	W.	42	U.	27 30.73	
28	1.7	W.	42	U.	27 30.77	
29	5.6	W.	36	U.	27 30.47	
29	8.6	W. ....	.....	U.	27 31.96	

RECORD OF NADIR POINTS FROM 1885 JAN. 9. TO 1885, NOV. 1.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h		°		° ' "	
Jan. 9	0.9	W.	+26	U.	125 26 55.02	Book A begins.
9	1.8	W.	+27	U.	26 55.00	
12	0.9	W.	+ 9	U.	26 24.11	{ Ref. wire almost imperceptible. Ref. wire exceedingly faint. Ref. wire very bad.
12	1.7	W.	+ 7	U.	26 24.55	
13	0.9	W.	.....	L.	26 18.38	
13	1.7	W.	+27	L.	26 19.27	
17	0.9	W.	+ 4	U.	26 23.55	
18	0.8	W.	- 4	U.	26 21.73	Ref. wire very poor.
18	1.8	W.	- 2	U.	26 22.75	Ref. wire very poor.
24	0.8	W.	+18	U.	26 34.04	
Circle reversed.						
30	0.9	E.	.....	C.	125 32 51.06	
30	1.7	E.	.....	C.	32 49.46	
Feb. 3	.....	E.	+27	Hn.	32 43.17	
5	0.9	E.	.....	C.	32 44.14	
5	1.6	E.	.....	C.	32 44.93	
5	5.4	E.	+17	U.	32 45.42	
5	5.8	E.	.....	C.	32 44.76	
5	6.3	E.	.....	U.	32 45.83	
6	1.2	E.	.....	U.	32 44.06	
6	2.4	E.	.....	U.	32 44.08	
11	.....	E.	.....	C.	32 54.40	
11	.....	E.	.....	C.	32 53.93	
14	0.9	E.	+11	C.	32 51.02	
14	1.5	E.	.....	C.	32 50.85	
16	.....	E.	.....	C.	32 52.83	
16	.....	E.	.....	C.	32 52.83	

WASHBURN OBSERVATORY.

7

RECORD OF NADIR POINTS — Continued.

Date.	Sid. Time.	Circle.	Temp.	Obsr.	Nadir Point.	Remarks.
1885.	h					
Feb. 18	0.9	W.	.....	C.	125 26 13.27	
18	1.5	W.	.....	C.	26 13.69	
19	0.9	W.	.....	C.	26 13.00	
19	1.5	W.	.....	C.	26 13.57	
20	0.9	W.	.....	C.	26 12.48	Rejected.
20	1.0	W.	.....	C.	26 12.93	
20	1.6	W.	.....	C.	26 13.21	
20	5.4	W.	+9	Hn.	26 14.78	
21	1.0	W.	.....	C.	26 14.62	
21	1.6	W.	.....	C.	26 14.20	
22	0.9	W.	+19	U.	26 14.62	
22	1.6	W.	+20	U.	26 15.03	
23	0.8	W.	.....	C.	26 13.78	Shutters closed.
23	0.9	W.	.....	C.	26 13.76	Shutters open'd
23	1.6	W.	.....	C.	26 14.62	
25	23 ^h	Tig	htened	bolts	which hold inst. to	pier.
25	0.8	W.	+33	C.	26 11.96	
25	1.6	W.	+34	C.	26 11.93	Circle reversed
26	0.9	E.	+38	U.	125 32 34.59	
26	1.6	E.	+39	U.	32 34.53	
26	6.0	E.	+34	Hn.	32 33.48	
26	8.4	E.	+29	Hn.	32 32.58	
27	0.9	E.	+41	L.	32 35.34	
27	1.5	E.	+40	L.	32 35.59	
27	2.0	E.	+40	U.	32 35.29	
Mar. 4	2.6	E.	.....	C.	32 33.18	
5	2.4	E.	+39°	C.	32 32.44	
5	2.5	E.	+39.6	C.	32 32.50	

RECORD OF CONSTANTS — Continued.

Date.	Sid. hour.	a.	b.	c.	Setting of N. C. U on S.	c. from Nadir.	Remarks.
1885. Mar. 16	7.7	a.	a. +0.420	.811	.827	.....	C.
16	9.2	.....	.....	.....	.....	+0.077	C.
16	9.8	.....	+0.427	.....	.....	.....	C.
17	7.7	.....	+0.442	.....	.....	+0.044	C.
17	8.0	-1.07	.....	.....	.....	.....	C.
18	1.7	.....	Azimuth	adjusted.	.....	.....
19	7.7	.....	-0.206	.....	.....	.....	C.
19	7.8	.....	.....	.....	.....	-0.061	C.
19	9.1	.....	.....	.....	.....	+0.011	C.
19	9.3	.....	-0.178	.....	.....	.....	C.
20	7.5	.....	.....	.....	.....	+0.044	C.
20	7.6	.....	.....	.818	.805	.....	C.
20	7.7	.....	-0.132	.....	.....	.....	C.
20	8.0	-0.02	.....	.....	.....	.....	C.
20	9.2	.....	-0.085	.....	.....	.....	C.
21	6.7	.....	.....	.808	.836	.....	U.
21	7.3	.....	-0.211	.....	.....	.....	C.
21	9.0	.....	-0.203	.....	.....	.....	C.
21	9.2	.....	.....	.....	.....	-0.010	Hn.
22	7.7	.....	-0.305	.....	.....	-0.019	C. Definition of reflected wire poor.
22	9.2	.....	-0.330	.....	.....	-0.040	
23		.....	Circle reversed.	.....	.....	.....
24	7.6	.....	-0.513	.803	.810	.....	C. Circle East.
24	7.8	.....	.....	.....	.....	+0.037	C.
24	9.0	.....	.....	.....	.....	-0.009	C.
24	9.2	.....	-0.506	.....	.....	.....	C.
26	5.0	.....	.....	.814	.822	.....	U.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S. C.	c. from Nadir.	Remarks.
1885		s	s				
Mar. 28	5.5	.....	.....	.810	.821	.....	U.
28	7.4	.....	—0.431	.....	.....	.....	Hn.
28	7.5	.....	.....	.....	.....	+0.008	Hn.
28	8 0	—0.04	.....	.....	.....	.....	Hn.
28	9.9	.....	.....	.....	.....	—0.002	Hn.
28	12.4	.....	—0.791	.....	.....	.....	C.
30	5.2	.....	.....	.810	.829	.....	U.
April 3	6 0	.....	.....	.810	.822	.....	U.
3	8.0	.....	—0.352	.....	.....	.....	Hn.
3	8.3	.....	.....	.....	.....	+0.061	Hn.
3	8.5	—0.02	.....	.....	.....	.....	Hn.
3	10.3	.....	—0.436	.....	.....	—0.066	Hn.
4	7.0	.....	.....	.819	.812	.....	U.
4	7.9	.....	—0.456	.....	.....	.....	Hn.
4	8.0	.....	.....	.....	.....	—0.023	Hn.
4	10.3	.....	—0.495	.....	.....	.....	Hn.
5	.....	.....	Circle reversed.		.....	.....
5	7.0	.....	.....	.810	.824	.....	U. Circle West.
5	8.0	.....	—0.478	.....	.....	—0.022	Hn.
5	10.3	.....	.....	.....	.....	—0.010	(Hn. This deter- minati'n better than precedi'g.
5	10.4	.....	—0.517	.....	.....	.....
6	6.0	.....	.....	.825	.787	.....	U.
8	6.5	.....	.....	.820	.771	.....	U.
8	8.5	—0.29	.....	.....	.....	.....	U.
8	8.5	—0.23	.....	.....	.....	.....	U.
9	6.5	.....	.....	.821	.768	.....	U.
12	7.0	.....	.....	.820	.754	.....	U.
13	7.0	.....	.....	.820	.754	.....	U.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour	a.	b.	c.	Setting of N. C. C. on S. C.	c. from Nadir.	Remarks.
1885.		s.	s.				
Apr. 13	8.5	.....	.....	.....	.....	—0.006	Hn.
13	8.6	.....	—0.316	.....	.....	.....	Hn.
13	9.8	—0.37	.....	.....	.....	.....	U.
13	10.2	.....	.....	.....	.....	—0.004	Hn.
13	10.4	.....	—0.800	.....	.....	.....	C.
21	.....	.....	.....	.....	.....	.....	Glass reticle found broken.
25	5.5	.....	.....	.508	.725	.....	U. Eye and ob- ject end inter- changed.
25	12.3	—0.10	.....	.....	.....	.....	.....
26	2.0	.....	.....	.377	.728	.....	U. Everything as before.
26	10.0	—0.08	.....	.....	.....	.....	U.
28	6.0	.....	.....	.379	.720	.....	U. New Mic. wire.
28	9.5	.....	.....	.....	.....	—0.095	Hn. Reflected wire faint.
28	9.8	.....	—0.800	.....	.....	.....	C.
28	12.3	.....	.....	.....	.....	—0.142	Hn.
28	12.4	.....	—0.791	.....	.....	.....	C.
28	0.0	.....	.....	.....	.....	.....	Level adjusted.
May 2	9.0	.....	.....	.375	.274	.....	C. S. C. turned 180°.
3	10.0	.....	—0.139	.....	.....	.....	C.
3	11.0	—0.05	.....	.....	.....	.....	U.
3	14.0	.....	.....	.376	.277	.....	U. S. C. turned 180°.
4	7.5	.....	.....	.384	.723	.....	U.
4	9.8	.....	—0.015	.....	.....	.....	U.
4	11.0	.....	.....	.....	.....	—0.046	Hn. Fair deter- mination.
4	11.3	.....	—0.158	.....	.....	.....	C.
5	10.0	.....	.....	.389	.715	.....	U.
5	11.0	.....	—0.300	.....	.....	.....	U.
5	12.	.....	.....	.391	.719	—0.059	Hn.
5	12.5	.....	—0.283	.....	.....	.....	Hn.

WASHBURN OBSERVATORY.

21

RECORD OF CONSTANTS—Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S.	c. from Nadir.	Remarks.
1885. May 6	8.0	a.	a.	.379	.712		U.
6	8.8			.381	(.712)		Hn. N. C. setting .712 used.
6	9.1			.387	.706		Hn
6	9.4			.392	(.706)		Hn. N. C. setting .706 used.
6	11.6	-0.09					U.
6	12.0		-0.26				U.
8	9			.393	.716		U.
9	11.6					-0.047	C.
9	11.8		-0.249				C.
10	7.5			.385	.731		U.
10	10.5		-0.260				C.
10	10.6					-0.036	Hn.
10	11.0	-0.10					Hn.
10	12.3		-0.273				C.
11	9.3			.384	.722		U.
11	11.0		-0.290				U.
11	11					-0.064	C.
12	9.0			.387	.716		U.
12	10.3					-0.095	Hn.
12	10.5		-0.405				C.
12	12.2		-0.412				C.
13	6.0			.384	.695		U.
13	6.3					-0.061	C.
13	6.4		-0.401				C.
13	6.5	Circle	reversed.				Circle West.
13	6.5			.381			C. by reversal on S. C.
13	6.8					-0.055	C.
13	7.0		-0.369				C.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. C. on S. C.	c. from Nadir.	Remarks.
1885.		s.	s.				
May 13	7.2	.....	.....	.381	.696	.....	U.
13	10.4	.....	—0.388	.....	.....	.....	U.
13	12.0	.....	—0.371	.....	.....	.....	C.
13	12.7	.....	—0.383	.....	.....	.....	C.
..	.....	.....	.....	.....	.....	.....	Eye end removed.
17	.....	.....	.....	.....	.....	.....	Eye end put b'k U. New Microm wire of proper thickness.
20	9.5	.....	.....	.394	.719	.....	C.
20	11.2	.....	—0.310	.....	.....	—0.048	C.
20	11.7	+0.20	.....	.....	.....	.....	U.
21	11.4	.....	.....	.....	.....	—0.011	Hn. Poor de- termination.
21	11.7	.....	—0.368	.....	.....	.....	C.
21	12.5	.....	.....	.....	.....	—0.002	Hn. Better than the first.
21	12.7	.....	—0.368	.....	.....	.....	C.
21	14.8	.....	—0.415	.....	.....	.....	C.
22	9.0	.....	.....	.400	.716	.....	U.
22	12.3	.....	.....	.....	.....	+0.002	Hn.
22	12.4	.....	—0.316	.....	.....	.....	C.
22	15.6	.....	.....	.....	.....	—0 012	Hn.
22	15.7	.....	—0.356	.....	.....	.....	C.
23	9.5	.....	.....	.399	.707	.....	U.
23	14.1	.....	.....	.....	.....	—0.032	Hn.
23	14.2	.....	—0.350	.....	.....	.....	C.
23	16.7	.....	—0.360	.....	.....	.....	C.
24	.....	Circle	reversed.	.....	.....	.....	Circle West.
24	11.5	.....	.....	.399	.....	.....	C By reversal on N. C.
24	12.0	.....	.....	.403	.697	.....	U.
25	8.0	.....	.....	.405	.684	.....	U.
25	12.6	.....	.....	.....	.....	+0.058	Hn.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S. C.	c. from Nadir.	Remarks.
1885.		s.	s.				
May 25	12.7	.....	-0.367	.....	.....	.....	C.
25	15.1	.....	-0.354	.....	.....	.....	C.
25	17.0	+0.47	.....	.....	.....	.....	Hn.
25	17.2	.....	-0.323	.....	.....	+0.055	C., Hn.
30	13.0	.....	.....	.399	.688	.....	U.
30	16.5	.....	-0.205	.....	.....	.....	C.
30	16.7	.....	.....	.....	.....	+0.019	C. Excellent.
30	17.8	+0.40	.....	.....	.....	.....	C.
30	21.0	.....	-0.175	.....	.....	.....	C.
30		Circle	reversed.	.....	.....	.....
June 1	10	.....	.....	.396	.697	.....	U. Circle East.
1	12.8	.....	.....	.....	.....	-0.045	C. Fair.
1	12.9	.....	-0.272	.....	.....	.....	C.
1	17.3	.....	-0.286	.....	.....	.....	C.
5	15.5	+0.38	.....	.....	.....	.....	U.
9	13.1	+0.41	-0.159	.....	.....	.....	U.
13	11.2	.....	.....	.402	.709	.....	U.
13	16.9	.....	-0.325	.....	.....	.....	C.
13	21.3	.....	-0.308	.....	.....	.....	C.
13	21.5	.....	.....	.....	.....	-0.045	C.
13	.....	+0.63	.....	.....	.....	.....	C.
18	15.8	+0.71	.....	.....	.....	.....	C.
20	11.0	.....	.....	.398	.701	.....	U.
21	20.0	+0.75	.....	.....	.....	.....	C.
21	21.3	.....	-0.205	.....	.....	.....	C.
21	21.5	.....	.....	.....	.....	-0.050	C.
23	11.0	.....	.....	.402	.714	.....	U.
23		Circle	reversed.	.....	.....	.....

RECORD OF CONSTANTS.—Continued.

Date.	Sid. Time.	a.	b.	c.	Setting of N. C. on S. C.	c. from Nadir.	Remarks.
1885.		s.	s.				
June 25	20.0	+0.42	.....	.....	.....	.....	C. Circle West.
25	21.2	.....	.....	.....	.....	+0.026	C.
25	21.3	.....	-0.306	.....	.....	.....	C.
26	16.0	+0.40	.....	.....	.....	.....	U.
26	14.7	.....	.....	.404	.686	.....	U.
29	15.0	.....	.....	.408	.724	.....	U.
29	21.0	+0.67	.....	.....	.....	.....	C.
29	21.3	.....	-0.061	.....	.....	+0.067	C.
July 2	16.0	.....	.....	.404	.704	.....	U.
8	15.8	+0.49	-0.199	.....	.....	.....	U.
6	15.7	+0.37	-0.170	.....	.....	.....	Hn., U.
11	15.8	+0.59	-0.052	.....	.....	.....	U.
14	16.0	.....	.....	.398	.705	.....	U.
14	20.0	.....	-0.121	.....	.....	.....	U.
14	21.0	+0.60	.....	.....	.....	.....	U.
14	21.6	.....	.....	.....	.....	+0.029	U.
15	19.5	.....	.....	.396	.696	.....	U.
15	19.9	.....	.....	.....	.....	-0.003	U. Excellent.
15	20.0	.....	-0.176	.....	.....	.....	U.
15	21.0	+0.68	.....	.....	.....	.....	U.
15	21.3	.....	.....	.....	.....	+0.014	U. Good.
15	21.5	.....	-0.141	.....	.....	.....	U.
19	.....	Circle reversed.	.....	.....	.....	.....
19	20.6	+0.56	-0.216	.....	.....	.....	U. Circle East.
24	17.7	+0.56	-0.109	.....	.....	.....	U., Hn.
29	17.2	+0.54	-0.112	.....	.....	.....	Hn.
30	17.9	+0.76	-0.161	.....	.....	.....	Hn.
31	7.7	.....	.....	.405	.724	.....	L.

RECORD OF CONSTANTS FROM 1885, JANUARY.—Continued.

Date.	Sid. Hour	a.	b.	c.	Setting of N. C. C on S.	c. from Nadir.	Remarks.
1885 Aug. 3	18.0	^{s.} +0.87	^{s.} -0.037	.....	.....	.....	Hn.
8	20.5	.....	-0.212	.....	.....	.....	U.
9	18.0	+0.85	-0.071	.....	.....	.....	U.
9	21.4	+0.82	-0.071	.....	.....	.....	U.
9	R. A.	Mic. was	found set	at. 590	.....	c = -	^{s.} 0.809
10	11.6	.....	.....	.385	.737	.....	L.
10	19.1	.....	.....	.393	.735	.....	U.
10	19.8	.....	-0.094	.....	.....	.....	U.
10	20.0	+0.81	.....	.....	.....	.....	Hn.
10	21.3	.....	.....	.....	.....	+0.013	Hn.
10	21.5	.....	-0.090	.....	.....	.....	U.
12	19.	.....	.....	.404	.735	.....	U.
13	19.	.....	.....	.395	.715	.....	U.
13	19.8	.....	-0.059	.....	.....	.....	U.
13	20.0	+0.68	.....	.....	.....	.....	Hn.
13	21.	.....	-0.071	.....	.....	.....	U.
14	20.0	+0.87	+0.019	.....	.....	.....	Hn., U.
14	21.3	.....	+0.035	.....	.....	.....	U.
15	20.0	+0.69	.....	.....	.....	.....	Hn.
15	20.8	.....	+0.010	.....	.....	.....	U.
15	21.	.....	+0.007	.....	.....	.....	U.
16	18.3	.....	-0.075	.....	.....	.....	U.
16	19.1	.....	-0.090	.....	.....	.....	U.
17	17.3	.....	-0.102	.....	.....	.....	U.
17	18.	.....	-0.086	.....	.....	.....	U.
18	8.5	.....	.....	.395	.741	.....	L.
18	18.9	.....	-0.186	.....	.....	.....	U.
19	19.0	+0.79	.....	.....	.....	.....	Hn.

RECORDS OF CONSTANTS — Continued.

Date.	Sid hour.	a.	b.	c.	Setting of N. C. on	c. from Nadir.	Remarks.
1885. Aug 18	19.8	a.	s.				U.
	18	21.5	—0.202				U.
	18	22.0	+0.74				Hn.
	18	22.6	—0.173				U.
	19	19.5	—0.070				U.
	19	20.4	—0.056				U.
	21	19.9	—0.119				U.
	21	20.0	+0.71				Hn.
	21	20.9	—0.124				U.
	22	9—		.399	.746		Hn., U.
	25	20.0	+0.68	—0.076			U.
	25	21.0	—0.061				U.
	26	19.0	+0.54				Hn.
	26	19.4	—0.037				U.
	26	20.0	—0.019				U.
	27	19.0	—0.073				U.
	27	19.5	+0.62				U.
	28	19.4	—0.139				U.
	28	19.8	—0.168				U.
	28	22.	+0.57				Hn.
	28	23.5	—0.162				U.
	28	23.7	—0.149				U.
	29	16.0		.402	.721		U.
	29	19.8	—0.147				U.
	29	21.0	—0.143				U.
	30	19.4	—0.136				U.
	30	20.0	—0.146				U.
	31	20.1	—0.122				U.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. C. on S. C.	c from Nadir.	Remarks.
1885 Aug. 31	21.0	a.	b. -0.094	.....	.....	.....	U.
Sept. 1	20.0	.....	-0.036	.....	.....	.....	U.
1	20.6	+0.63	.....	.....	.....	.....	Hn.
1	21.0	.....	-0.046	.....	.....	.....	U.
1	22.5	.....	-0.079	.....	.....	.....	U.
1	22.9	+0.53	.....	.....	.....	.....	Hn.
1	23.2	.....	-0.102	.....	.....	.....	U.
4	22.6	.....	-0.085	.....	.....	.....	U.
4	23.2	+0.45	.....	.....	.....	.....	Hn.
5	14.5	.....	.....	.397	.726	.....	U.
9	20.5	+0.41	-0.225	.....	.....	.....	U.
18	19.5	.....	.....	.398	.726	.....	U.
18	21.5	.....	-0.229	.....	.....	.....	U.
18	22.0	+0.55	.....	.....	.....	.....	Hn.
18	23.5	.....	-0.239	.....	.....	.....	U.
14	19.5	.....	.....	.400	.719	.....	U.
14	21.7	.....	-0.195	.....	.....	.....	U.
14	21.9	.....	-0.197	.....	.....	.....	U.
14	23.9	.....	-0.172	.....	.....	.....	U.
17	20.0	+0.56	-0.153	.....	.....	.....	U.
21	21.0	.....	-0.240	.....	.....	.....	U.
26	19.4	+0.47	-0.238	.....	.....	.....	U.
Oct. 1	20.6	+0.46	-0.047	.....	.....	.....	U.
6	0.0	+0.15	+0.076	.....	.....	.....	U.
11	20.5	.....	.....	.405	.270	.....	U. S.C. turned 180°.
11	21.0	+0.41	-0.207	.....	.....	.....	U.
12	21.0	+0.41	-0.210	.....	.....	.....	U.
14	21.0	+0.32	-0.182	.....	.....	.....	U.

RECORD OF CONSTANTS — Continued.

Date.	Sid. Hour.	a.	b.	c.	Setting of N. C. on S. C.	c. from Nadir.	Remarks.
1885.		s	s				
Oct. 15	21.0	+0.39	-0.148	.....	.....	.....	U.
16	21.0	+0.42	-0.128	.....	.....	.....	U.
17	23.0	+0.10	-0.097	.....	.....	.....	U.
21	8.0	+0.05	-0.039	.....	.....	.....	U.
21	22.5	.....	.....	.392	.702	.....	U.
22	23.6	.....	-0.149	.....	.....	.....	U.
22	1.0	.....	-0.134	.....	.....	.....	U.
22	2.4	.....	-0.117	.....	.....	.....	U.
23	0.0	+0.14	-0.177	.....	.....	.....	U.
24	23.0	+0.13	-0.227	.....	.....	.....	U.
28	13.0	Circle	reversed.				Obj. taken out and replaced.
28	23.5	.....	.....	.405	.707	.....	U. Circle West.
28	0.0	+0.10	-0.177	.....	.....	.....	U.
29	22.0	.....	.....	.399	.708	+0.053	U. Nadir obs. very poor.
29	5.7	.....	-0.107	.....	.....	.....	U.
29	7.2	.....	-0.075	.....	.....	.....	U.
29	8.8	.....	-0.053	.....	.....	.....	U.
30	22.0	.....	.....	.398	.703	.....	U.

WIRE-INTERVALS OF THE (SECOND) GLASS-RETICLE.

In Publications of the Washburn Observatory, vol. III, page 8, it was said that a second glass reticle was inserted in April 1885. This one is similar to the first in all respects.

For stars south of 65° the groups M (3 wires), O (5) and P (3) are used; for northern stars the group O of 13 wires is used.

A south star, Circle West, crosses the wires in the order, M, O, P. The wires retain their names in both positions of the clamp. The intervals were deduced from transits observed for determining the R. A., of the 303 fundamental stars for the southern zones of the *Astronomische Gesellschaft*.

M_1 to O_7 (mid-wire.)
 $12^{\circ}.062 \pm 0^{\circ}.004$.

M_2 to O_7 .
 10.055 ± 0.004 .

M_3 to O_7 .
 8.042 ± 0.004 .

O_1 to O_7 .
 4.028 ± 0.004 .

O_4 to O_7 .
 2.011 ± 0.004 .

O_{10} to O_7 .
 2.023 ± 0.004 .

O_{13} to O_7 .
 4.017 ± 0.004 .

P_1 to O_7 .
 8.040 ± 0.004 .

P_2 to O_7 .
 10.038 ± 0.004 .

P_3 to O_7 .
 12.043 ± 0.004 .

The reductions for the close wires of O are as follows:

$$O_2 \text{ to } O_7 ; 3.351 \pm 0.006.$$

$$O_3 \text{ to } O_7 ; 2.690 \pm 0.006.$$

$$O_5 \text{ to } O_7 ; 1.334 \pm 0.006.$$

$$O_6 \text{ to } O_7 ; 0.661 \pm 0.006.$$

$$O_8 \text{ to } O_7 ; 0.674 \pm 0.006.$$

$$O_9 \text{ to } O_7 ; 1.339 \pm 0.006.$$

$$O_{11} \text{ to } O_7 ; 2.673 \pm 0.006.$$

$$O_{12} \text{ to } O_7 ; 3.351 \pm 0.006.$$

Bisections in declination are made at wires L and Q, whose reductions are about $20'' \sec. \delta$.

Professor ROGERS has been kind enough to rule a third glass reticle in which I have arranged the spaces more conveniently for our plan of work. This reticle will be subsequently inserted, and when it is, the present (second) reticle should be given to Professor ROGERS to aid him in some investigations which he has undertaken on the permanence of lines ruled on glass plates.

III. REMARKS ON THE OBSERVATIONS AND REDUCTIONS OF THE 303 FUNDAMENTAL STARS FOR THE SOUTHERN ZONES OF THE ASTRONOMISCHE GESELLSCHAFT, DURING 1884 AND 1885, AND OF MISCELLANEOUS STARS DURING THE SAME PERIOD.

The REPSOLD Meridian-Circle was used for all the work here described. It has proved itself to be an essentially perfect instrument both optically and mechanically so far as our tests have extended. Its objective by ALVAN CLARK AND SONS has an aperture of 4.80 English inches. I have often seen ϵ *Draconis* (Mags. 5.5 9.5; $s = 2''.8$) double with it and once α *Scorpii*, (Mags. 1 7; $s = 3''$) in a bright field using a power of 174.

Its mechanical excellencies have been spoken of in *Publications of the Washburn Observatory*, vols. II, III.

The observing list contained at first the 303 stars named (see v. J. S. *der Ast. Gesell.* Band 15 S. 270); to these I added the list of Refraction Stars selected for observation at Leyden and the Cape (see v. J. S. BAND 16 S. 342) and in 1885 a further list of 23 circumpolars for refraction.

The polar stars and other determining stars for each night were taken as needed from the lists of the *Berliner Jahrbuch*. These selections were not made with as much system as is desirable, but any convenient standard stars were used, instead of a special and limited list. There are 303 stars in the stars to be determined. 134 of these occur in Catalogue I_n (*Publ. XIV, der Ast. Gesell.*) or in Catalogue I, (*Publ. XV.*) 169 are not in either work. There are also 36 southern refraction stars and 34 near our zenith.

In 1885 I added 23 circumpolar stars from the B. J. whose Z. D. north, at L. C. was about that of the southern stars of the Leyden refraction list. These are observed in R. A. for the determination of α and in Decl. for refraction. The observed Decls. of these Refraction Stars do not enter into the computation of the Equator points.

REDUCTION OF OBSERVATIONS IN RIGHT ASCENSION.

In the determination of all constants the programme laid down in *Publications of the Washburn Observatory*, vol. II, pp. 73-92 has been strictly followed. Our experiments in 1883 having shown that the azimuth and level constants varied with the temperature (*Publications of the Washburn Observatory*, vol. II, p. 72), it was thought that a better control of the instrumental constants might be obtained if the observations in R. A. were reduced by MAYER's formula where a and b enter explicitly. Most of our observations have been reduced in this way, though it is doubtful if much has been gained. There is a certain advantage in having two constants b , c , given independently by mechanical measures and in determining a relation between them by measures over mercury at the same time.

The *collimation* is determined immediately before each night's work. The *p. e.* of a single c is $0^s.003$, if we consider the accuracy of the single operations. This number results from our preliminary work in 1883 and also from a discussion of actual determinations made during the progress of the observations of the 303 stars. The determinations however must be affected by *constant* errors much larger than this. As a check c is also determined over mercury at the time of taking the nadir.

The *level* is determined at the beginning and at the end of each night's work and interpolated linearly between the determinations. The *p. e.* of each b is about $0^s.008$ for the 303 star work.

The stars observed in R. A. are of three classes:

- (a) Stars whose apparent places are given in the B. J.
- (b) Stars whose mean places (only) are given in the B. J.
- (c) Stars not occurring in the B. J.

All the stars in the refraction list which occur in the B. J. are observed in R. A. as zero stars. Those zero stars (class a) whose apparent places are given in the B. J. are used precisely as there given, thus including proper motions, and the mean places for 1884.0, 1885.0, in-

clude the proper motion of the B. J. Those zero stars (class *b*) whose mean places (only) are given in the B. J. are reduced to apparent place on the regular reduction-sheets, and the proper motions in R. A. and Dec. are written in [] on these sheets. The proper motions from Publ. A. G. XIV are included in determining α and ΔT .

After the apparent R. A. of the night has been deduced for such stars they are further reduced to mean places for 1884.0, 1885.0, *including* the proper motions. The stars of class *c* are, naturally, reduced without applying proper motions. The process just described with regard to α and ΔT is also employed in determining Equator Points.

All right ascensions, including those of polars, have been observed on the chronograph. Very close polars are avoided as far as possible, since time is saved in this way.

The clock employed is HOHWU No. 32 (sidereal). It was mounted in April 1881, and its running was very satisfactory till the first part of 1884. In October 1884 it was dismounted and cleaned, since which time its rate is excellent. Its running is fairly represented by the formula:

$$(R) = R + 0.8.001 (t-40) - 0.8.30 (B-30).$$

Until August 1884, the electric signals from this clock were made by the contact apparatus provided by the maker. This gave signals every 2^s, and it was found necessary to have the apparatus adjusted so as to make the signals on the chronograph sheet much longer than is desirable.

The wires of the reticle have (unfortunately) intervals of about 2^s for most of the 303 stars. Hence if a star falls near the clock second on the first wire it will do so on every other wire. As the clock signals were long (about 0.^s20) there is no way of distinguishing 0.^s00 from 0.^s10 say. Hence all stars for which T was an *even-numbered* second may be slightly in error and their R.A.'s have been marked thus : x . After August 1884, a mercury globule was placed below the pendulum which thus gave 1^s signals. As the globule was not *exactly* in the middle of the arc, the consec-

cutive seconds were very slightly unequal in length. In reading the chronograph sheets no attention is paid to the odd-numbered seconds, but the chronograph-scale is adjusted to the nearest even-numbered second only.

DETERMINATION OF THE AZIMUTH-CONSTANT IN DIFFERENTIAL RIGHT-ASCENSION OBSERVATIONS.

The azimuth-constant a , of our meridian circle is determined from a series of equations (one for each observed star) like the following:

$$R. A. = T + \Delta T + A.a + B.b + C.c, \quad (1)$$

in which $R. A.$ is the star's right-ascension (supposed known and without error); T , the mean of the star's transits over n threads, after each thread has been reduced to the middle thread; A, B, C , the azimuth, level and collimation factors; a, b, c , the corresponding constants. b and c are determined by mechanical means, each with a probable error of about $0^s.006$, at Madison. The probable error of T for a given declination can be determined from previous observations. The azimuth-constant is then known from a series of equations like the following:— r being the p. e. of a transit over one thread:

$$R. A. - T. \pm \sqrt{\frac{r}{n}} - B(b \pm 0^s.006) - C(c \pm 0^s.006) = \Delta T + A.a, \quad (2)$$

from which ΔT is eliminated. T is the same for all these equations, provided the clock rate is known and has been introduced.

Any two equations will give a value for a . It is our custom to combine each star U. C. north of $+65^\circ$ with south stars near it in $R. A.$, also with stars L. C. and to deduce several values of a . These are not strictly independent. The various values of a are weighted and the resulting weighted mean is taken as the adopted a , if the azimuth is to be considered as constant (as is usually the case with our instrument).

The question is, what weights should be assigned to the various combinations? It is not necessary that these

weights should be accurately known, but it is desirable to know the approximate weights on a scale of 1 to 10 for example.

These may be obtained in a simple manner from equation (2) which is:

$$\Delta T + A.a = \text{Constant} + R, \text{ where } R = \pm \sqrt{\{r_t^2 + r_c^2 + r_b^2\}}.$$

This equation is to be written out for stars in -30° , -15° , 0° , etc., $+45^\circ$, $+65^\circ$, $+70^\circ$, $+75^\circ$, $+80^\circ$, and for the polars both U. C. and L. C. as well as for S. P. declinations of $+100^\circ$, $+105^\circ$, $+110^\circ$, $+115^\circ$. Two such equations are, for example:

$$\begin{aligned} A.a &= -\Delta T + C \pm R \\ A'.a &= -\Delta T + C' \pm R', \quad \text{from which} \end{aligned}$$

$$a = \frac{C - C'}{A - A'} \pm \frac{\sqrt{R^2 + R'^2}}{A - A'}.$$

The last term of this may be taken as the *p. e.* of the *a* from this combination, with sufficient exactness for our own present purpose, and from this *p. e.* the relative weights of various combinations may be found.

I have asked Miss ALICE LAMB, assistant in the observatory, to do this, except that north of $+80^\circ$, I have selected *three* polars to stand for the *nine* of the B. J., viz., 76 *Draconis*, δ *Ursae Minoris* and *Polaris*. That is 76 *Drac.* may stand for 1 H. *Drac.* and ϵ *Urs. Min.*; δ *Urs. Min.* may stand for Gr. 750, 43 H. *Cephei* and 51 H. *Cephei*; and *Polaris* for λ *Urs. Min.*

The values of r_t were taken from the Pulkowa observations, vol. I, for Declinations -30° to $+70^\circ$, and for δ *Urs. Min.* and *Polaris*. For the other Stars and Declinations Miss LAMB has determined r from our observations of 1884-5. In any case, the assumed values must be sufficiently near to the truth for our present object. The following table gives the approximate *weights* of *a* as derived from the various combinations. For curiosity I have had all the combinations computed. If a star whose (name or) declination is found in the vertical left hand argument has been observed with a star whose (name or) declination is found in

the upper horizontal argument, the *weight* of the *a* deduced from the combination is found in the table in the line belonging to the first and in the column belonging to the second.

If it is remembered that these weights are but approximate, the table may be considered to be of use for stations whose latitudes are not too far from $+43^{\circ}$. This table of weights has only been employed for observations since Sept. 1, 1885.

REDUCTION OF OBSERVATIONS IN DECLINATION.

The stars observed in Declination are of the classes *a*, *b*, *c*, previously mentioned, and also of the class *d*; *i. e.* — Refraction stars not in the B. J.

All stars are observed in Declination whenever possible. For determination of the equator-point only those stars are employed which culminate above the pole and whose places, apparent or mean, are given in the B. J., except that *both* culminations of the nine circumpolars of the B. J. are used. Other stars L. C. are observed (in Declination) for the determination of the refraction only. Two nadirs are observed on each night (and occasionally as many as five or six). The change of equator point is assumed to be proportional to the change of nadir point, and the reductions are first made under this assumption, which is sometimes modified to obtain a better representation.

The apparent equator-points are determined from each B. J. star U. C. or from any one of the nine polars. These equator points are corrected for the change in the nadir-point; and the corrected equator points are used to obtain the apparent declinations.

The reductions have been nearly all made by Mr. GEORGE C. COMSTOCK. Since July 1885, Professor F. H. BIGELOW, of Racine College, has reduced the greater part of the R. A. observations and Mr. UPDEGRAFF has reduced the Declinations. Almost all the reductions to 1884.0 and 1885.0 have been made by Professor BIGELOW.

METHODS OF OBSERVATION.

The programme for each night's observation is made out during the preceding day. The observing room is opened several hours before the work commences in order to equalize the internal and external temperatures. In the few cases when this has been neglected the results are poorer for the neglect. During the hotter summer months the roof of the observatory was often thoroughly wetted by a hose just after sunset.

Forty minutes before the first star of the programme, the determination of the constants of the night is begun

These are determined exactly as prescribed in Vol. II of our *Publications*. Usually the collimation is first determined (10 double pointings of N. C. on S. C.; and 5 settings of the telescope micrometer on the N. C. and S. C.). This requires from 15 to 20 minutes. The nadir-point is next determined (10 to 12 minutes), and the collimation is measured over mercury.

The level-constant is next determined (3 reversals). This requires from 6 to 8 minutes. Since March 1885, the telescope has (nearly always) been moved 360° or 720° in Z. D. before making observations for the constants.

In the actual observations of the stars, three operations have to be performed:

A. The telescope micrometer has to be (twice) set on the star at wires L and Q whose reductions to O', the mid-wire, are 20" Sec. Dec., and the transits of stars south of $+65^\circ$ have to be observed over wires O', O', O', O', O', (Circle Wand E) P', P', P' (Circle W) or M', M', M', (Circle E) whose distances from O' in the equator are respectively 4", 2", 2", 4", 8", 10", 12". For polar stars the bisections are made at any convenient wires symmetric with O' (usually M' and P') and the transits are observed over the wires O', O', O', O', (equatorial intervals about C:67).

The Leyden refraction stars if not included in the B. J. are usually bisected at L, O' and Q. Circumpolars are often bisected twice on each side of O'. All bisections are symmetric with O'.

B. The telescope has to be clamped at the computed setting for the star, the microscopes read twice, and the meteorological instruments read. Except at the very first the external thermometer has been read every 20^m, the barometer every 40^m.

C. The various readings of micrometer heads, etc., have to be recorded.

The persons who have taken part in the observations are:

E. S. H. = Professor E. S. HOLDEN; G. C. C. = Mr. G. C. COMSTOCK; J. T. = Mr. JOHN TATLOCK; G. W. B. = Mr. G. W. BROWN; M. U. = Mr. M. UPDEGRAFF; A. M. L. = Miss LAMB.

A has been done by either E. S. H. or G. C. C., and latterly by M. U. G. C. C. left the observatory in July 1885.

B and C from May 2, to August 1, 1884, were done by J. T.

During September and part of October 1884, the microscopes were read once by G. C. C., a second time by G. W. B. and C, was done by M. U. From October 15, 1884 to 1885 June, A was done by E. S. H., B, by G. C. C., and C, by M. U. During June and July, 1885, A was done by G. C. C.; B, by G. W. B.; C, by M. U. Until October 23, 1885 the microscopes have usually been read by M. U., and the services of a recorder, usually G. W. B., have been required only occasionally; A. M. L. has recorded for a few nights' observations. Since November 1, 1885, M. U. and A. M. L. have observed together.

The cost to the University of each star, observed, reduced to mean place and copied for the printer has been about sixty-six cents. This estimate omits my personal salary as Professor of Astronomy and all items relating to the care of the observatory buildings. The actual process of observation of each star is as follows:

As soon as the preceding star has been observed and marked off on the programme of the night, the telescope is set on the nearest 2' division by the coarse setting microscope and clamped. Observer B then goes at once to microscope II or VI and by the fine motion sets the circle division between its wires when the head is at zero. The telescope is thus entirely at rest from 2 to 3 minutes, on the average, before the transit of the star. Also, no correction for runs is required, and if there is any distortion to the fields of the microscopes it has the same effect on all stars. The runs were regularly determined however.

About 1^m 30^s before the star's transit, observer A takes his place at the telescope. The illumination is made exactly right as the star enters the field, and the micrometer thread is placed about 0'.02 less than the bisection of the star, and the eyepiece is moved so that wire L (Circ. W.) is central in the field.

Observer A notes the reading of the micrometer head to the nearest 0'.1 and carries this in his mind. Observer B

now reads the microscopes twice round. The last microscope is usually read just after the last micrometer bisection. The star is bisected by observer A at wire L (Circ. W.), the transit wire O^{10} is placed centrally in the field, and the micrometer wire is moved to $0''.02$ less than bisection. Transits over eight wires (south stars) or thirteen wires (north stars) are then observed on the chronograph by A. The wire Q is next placed central and a second bisection is made. Observer U records the various readings, etc., which are given to him. As soon as the observation is finished, the telescope is again set, and so on.

The right ascension of south stars is always observed on eight wires, the declination on two. The disposition of the wires in the reticle might be improved by giving about $20''$ more time between the bisections, and by making the intervals of the wires unequal instead of equal. But, as the reticle now is, there is not the slightest hurry in the observations. There is also no time to spare.

Zenith stars are the only ones which are difficult to observe, and this is due to the constrained position. The magnifying power used is 174. The field of view is $9'.2$. At the end of the observations the nadir point and the level-correction are again determined. Occasionally the collimation is again determined, but experience has shown this labor to be unnecessary. The change is always within the probable error.

ZENITH-DISTANCE MICROMETER.

On 1885 July 22-23, Rev. Father HAGEN made 4 series and determined the value of one revolution to be

$$64''.508, \quad t=79^\circ,$$

which agrees with the value deduced from observations between 1884 July and November, *viz.*:

$$64''.5033 \pm 0''.0042.$$

CHANGES OF THE EQUATOR-POINT WITH TEMPERATURE.

Most of our reductions in Declination are effected by plating the apparent equator-points and by drawing an interpolating curve. The relations between this curve and

changes of temperature are quite interesting. In order to reduce the amplitude of the curve I have had the microscope bearers and the microscopes neatly wrapped in woolen cloth, and I expect in this way to materially lighten the labor of reductions of Z. D. observations.

REFRACTION.

A discussion of all the Declinations of 1884, by Mr. COMSTOCK, gave $+0''.30 \pm 0''.026$ as the correction to the constant of refraction of the Pulkowa Refraction Tables, assuming the places of the B. J. as fundamental. The stars of the various zones agreed tolerably well, as shown by the following table, (from the work of 1884 only.):

ZONE.	CORRECTION.	WT.	NO. OBS.
-30° to -20° ;	Corr. = $+0''.34 \pm 0''.06$,	7,	113.
-20° to -10° ;	= $+0.25 \pm 0.11$,	2,	143.
$+44^\circ$ to $+117^\circ$;	= $+0.29 \pm 0.03$,	27,	169.

Such stars of the refraction list as are contained in the B. J. are included in the above table. No discussion has yet been made of the absolute Z. D. of these and other refraction stars, nor of the observations of 1885.

It is intended to observe each refraction star ten times at least, and this series is now in progress. Until it is completed no useful conclusion can be drawn. Observations of the horizontal flexure must be maintained and an investigation of the division errors is also necessary. It should be noticed here that the observatory possesses two barometers. One, GREEN No. 5162, is read for all refraction determinations. This is a standard barometer of the best construction with a tube 0.5 inch in diameter. Another is the Signal-Service barometer, No. 2308, also by GREEN. The latter is read for our meteorological work, and is constantly about $+0.02$ *higher* than 5162. Before any final conclusions are reached as to the refraction, our barometer should be compared with another standard.

REFRACTION THERMOMETER.

Exposure.—The Fahr. thermometer GREEN No. 5164 was mounted in 1881 in a large and very excellent shelter outside of the N. E. window of the Meridian Circle Room. The

walls of the shelter are all double louvre-work. Its dimensions are 2 feet by $3\frac{1}{2}$ feet by 4 feet. The stone wall below the *bottom* of the shelter (which is not open, but made of single louvre-work) was covered with pine boards in 1885 as was also the adjacent stone of the walls of the Dome and Meridian Circle Room.

Thermometer.—On Nov. 5, 1881, the thermometer 5164 was found to have corrections as follows (*Publ. Washburn Obsy.* vol. i, p. 32) at 32° ; 52° ; 72° ; 92° of 0.0 ; 0.0 ; 0.0 ; -0.1 . These corrections were determined at the Winchester Observatory, New Haven.

From May 1, 1884 to May 15, 1884 Mr. TATLOCK read S. S. Therm. No. 515 for refraction by a misapprehension. The readings of 515 have been reduced to 5164 by the first part of the table given below. All other readings for refraction have been made from 5164.

The accompanying table gives comparisons which have been made between 5164 and the Signal Service thermometer 515 at four periods, viz.: May–June, 1884, December, 1884–January, 1885; July–August, 1885; and October–November, 1885. Immediately after the 3rd of these comparisons, Therm. 515 was sent to the Thermometric Bureau of the Winchester Observatory of Yale College, and was returned September 30. As soon as it was received, the fourth series of comparisons was begun.

The Winchester Observatory reports the following corrections to 515, September 30, 1885:

Temp— 2° ; 10° ; 20° ; 32° ; 42° ; 52° ; 62° ; 72° ; 82° ; 92° .
Cor.: -0.5 ; -0.6 ; -0.6 ; -0.3 ; -0.1 ; -0.2 ; -0.1 ; -0.0 ; -0.0 ; $+0.2$.

Temperature.	Date.	5164-515	No. 5164-515 Obs	No. 5164-515 Obs	Date.	5164-515	No. Obs	Date.
-20° to -10°	Dec., '84-Jan., '85	+0° .010	10					
-10 to 0	Dec., '84-Jan., '85	-0 .042	12					
0 to +10	Dec., '84-Jan., '85	-0 .082	17					
+10 to +20	Dec., '84-Jan., '85	-0 .140	10					
+20 to +30	Dec., '84-Jan., '85	-0 .120	15			-0.09	17	October-Nov., 1885.
+30 to +40	Dec., '84-Jan., '85	-0 .150	6			+0.07.	40	October-Nov., 1885.
+40 to +50	May-June, 1884	+0 .175	4	+0.067	July-August, 1885	+0.10	26	October-Nov., 1885.
+50 to +60	May-June, 1884	+0 .237	19	+0.18	July-August, 1885	+0.10	13	October-Nov., 1885.
+60 to +70	May-June, 1884	+0 .280	31	+0.24	July-August, 1885	-0.08	5	October-Nov., 1885.
+70 to +80	May-June, 1884	+0 .366	6	+0.34	July-August, 1885			
+80 to +90	May-June, 1884			+0.41	July-August, 1885			

HORIZONTAL FLEXURE FROM OPPOSING COLLIMATORS.

As has been previously stated the very contracted size of the meridian-circle-room does not allow of reflection observations. We are thus forced to observations of opposing collimators for the determination of the flexure. The following table gives the (too few) observations which have been made since the publication of our Volume III.

HORIZONTAL FLEXURE; G. C. C., OBSERVER.

DATE; 1885.	Temp.	Circle.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
	°		"	"
June 8	+70	E.	+1.80	+0.88
June 8	+67	E.	+0.86	+1.04
June 8	+67	E.	+0.88	+0.89
Sums			+3.04	+2.81
Mean.....			+0".98	±0".05

6 Observations.

HORIZONTAL FLEXURE; A. M. L., OBSERVER.

DATE; 1885.	Temp.	Circle.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
August 4.....	+69	E.	-0.82	.....
August 5.....	+71	E.	+1.09	+0.83
September 7.....	+60	E.	+0.66	+1.07
September 8.....	+59	E.	+0.28	+0.21
September 8.....	+59	E.	+0.24	-0.18
September 29.....	+66	E.	+0.75	+0.44
September 29.....	+67	E.	+0.75	+0.81
September 30.....	+67	E.	+0.80	+0.79
September 30.....	+67	E.	+0.41	-0.14
October 28	+44	W.	+0.34	+0.33
November 5	+42	W.	.....	+0.25
November 5.....	+43	W.	+0.07	+0.03
November 6.....	+44	W.	-0.03	+0.14
November 6.....	+45	W.	+0.18	+0.32
Sums			+4.72	+4.90
Mean.....			+0'.37	± 0'.06

26 observations.

PROBABLE ERRORS OF A SINGLE RIGHT-ASCENSION.

From the right ascensions of all stars observed in 1884, five or more times we find, probable error of a single R. A. of a star in the 303 list:

For Observer E. S. H. = $\pm 0''.037$ (202)

For Observer G. C. C. = $\pm 0''.031$ (476)

PROBABLE ERRORS OF A SINGLE DECLINATION.

The declinations of the 303 stars for 1884, give the following results for the probable-errors of a single declination, using every star which has been observed four times or more.

Observer E. S. H.

p. e. of zenith stars and polar stars, $\pm 0.^{\circ}413$ (41)
p. e. of the 303 stars, ± 0.400 (259)

Observer G. C. C.

p. e. of zenith stars and polar stars, ± 0.391 (78)
p. e. of the 303 stars, ± 0.436 (889)

The work of 1885 is probably somewhat more accordant than that of 1884.

RELATIONS BETWEEN OBSERVATIONS CIRCLE WEST AND CIRCLE EAST, AND BETWEEN THE OBSERVERS E. S. H. and G. C. C.

All stars observed in 1884, which have two or more observations by Hn. or two or more by C. in each position of the circle, were selected and tabulated as follows:

West minus East.

OBSERVER:	R. A.	Dec.
HOLDEN;	$-0.^{\circ}008$ (70)	$+0.^{\circ}08$ (78)
COMSTOCK;	-0.006 (124)	-0.04 (137)

Also all stars observed twice or oftener by Hn. and twice or oftener by C. gave:—

	R. A.	Dec.
HOLDEN minus COMSTOCK:	$-0.^{\circ}024$ (74)	$-0.^{\circ}32$ (71)

All stars observed in 1885 which have two or more observations by C. or two or more by Hn. in each position of the circle were selected and tabulated as follows:

West minus East.

OBSERVER:	R. A.	DEC.
HOLDEN ;	$-0.^{\circ}016$ (21)	$+0.^{\circ}23$ (19)
COMSTOCK;	-0.010 (20)	$+0.04$ (38)

Also all the stars observed twice or oftener by Hn. and twice or oftener by C. gave:—

	R. A.	DEC.
HOLDEN minus COMSTOCK:	$-0.^{\circ}030$ (17)	$+0.^{\circ}09$ (15)

The data were insufficient to determine $U. C. \text{ minus } L. C.$ for each observer in both years 1884, 1885.

No corrections have been introduced into the star-places as printed in part VII of this volume on these accounts.

OBSERVATION WITH SCREENS FOR THE PURPOSE OF DETERMINING THE EFFECT OF THE MAGNITUDE OF A STAR ON THE TIME OF ITS TRANSIT.

In 1885 February, the Messrs. REPSOLD were kind enough to supply enough wire netting to make three screens each large enough to cover the objective of the Meridian-Circle. Observations with the screens have been made by the observers E. S. H. and G. C. C. in the following manner.

Before the star enters the field, the illumination was reduced to the lowest point. As the star entered the field, the screens were held before the objective by an assistant and the magnitude of the star so seen was carefully estimated. The transits over five wires were observed through the screens; the assistant then removed the screens and the transits over the last five wires were observed with the star at its full brightness but with the illumination of the field unchanged. The transits reduced to the middle thread were then compared and the results of each night were tabulated separately. Much of this work has been done in hazy weather (not cloudy) and the recorded magnitudes as reduced by the screens indicate a greater absolute reduction of magnitude by the use of the screens, than would occur in clear weather. For example a star of 3 mag. is often recorded as of 8 mag. through 2 screens. It does not follow that 2 screens reduce the light by 5 mags. but it is often the case that at least one mag. has been lost by haze.

EFFECT OF TWO SCREENS IN REDUCING THE MAGNITUDES OF STARS.

On 1885, July 27, 29, 30 and Aug. 3, I made repeated comparisons between D. M. + 9°, No. 3564 (72 *Ophiuchi*) and D. M. + 9°, No. 3565 with and without two screens. I found D. M. 3565 without screens to be 0.34 mag. brighter than 72

Ophiuchi through 2 screens, as seen with the meridian circle. Professor PICKERING was kind enough to determine the difference of mag. of the two stars as 3.7 (3 nights.) The Harvard Photometry gives the mag. of 72 *Ophiuchi* as 3.85; hence 3565 is 7.55 mag., and 72 *Ophiuchi* through 2 screens is 7.89. That is, 2 screens reduce the absolute mag. by 4.0 mags. This result agrees with all our estimates made of other stars and is adopted as the constant.

OBSERVATIONS THROUGH SCREENS.

G. C. C. observed 30 stars between 1885 Feb. 22 and 1885 June 15, through 3 screens. The mean of all the 30 observations gives $+0.049$ as the effect of 3 screens. If we arrange these observations with reference to the mag. of the stars as seen through 3 screens we find:

Reduced Magnitude.	Faint-Bright.	Number Observations.	
5 to 6.5 inclusive.	$+0.041$	7	} G. C. C.
7 to 7.5 inclusive.	$+0.038$	13	
8 to 8.5 inclusive.	$+0.063$	9	

For one of the stars the reduced mag. was not recorded.

G. C. C. also observed 108 stars through 2 screens between Feb. 22 and June 15. The mean of all the 108 observations gives $+0.046$ as the effect of 2 screens. Arranging these observations with reference to the mag. of the stars as seen through two screens we find:

Reduced Magnitude.	Faint-Bright.	Number Observations.	
6 and brighter.	-0.004	7	} G. C. C.
6.5	$+0.033$	10	
7.	$+0.044$	18	
7.5	$+0.023$	27	
8.	$+0.068$	28	
8.5 and fainter.	$+0.079$	11	

For 7 stars the reduced mag. was not recorded. On these tables it is to be remarked that observations with two and

with three screens appear to give the same results for Faint minus Bright, viz.:

$$+0.049 \text{ (III), and } +0.046 \text{ (II).}$$

This is *a priori* quite improbable, and I believe does not agree with the results of other observers. The tables show on their face that the difference Faint minus Bright depends on the absolute magnitude of the star as reduced by the screens, and not on the difference of the mags., with and without screens, as it would seem *a priori* likely to do.

In order that the numbers of the tables should be applicable to the deduced R. A. of the 303 stars it is necessary that the star when seen without the screens should be observed under the same conditions of illumination as for the 303 stars.

This, I think, has not been the case in the above observations. The illumination of the field for the regular observation of the 303 stars was usually so bright that for a star 7 mag. it had to be slightly reduced. Certainly this was the case for my own observations. For the screen observations, the illumination of the field was at once reduced so that the star when *faint* could be easily seen and it was not changed for *bright*. Hence bright stars were observed quite differently in the two cases. In the 303 star observations the wires for bright stars were so plain that the *bisection* of the star by the wire was taken as the instant of transit. In all the preceding screen observations the wires were faint, and there was at least a tendency to observe a limb of the bright star rather than its centre. While the screen observations of G. C. C. were going on, I frequently looked at his stars when reduced and spoke of the fact that the wires were too faint for my own observations. He has since told me that stars marked 9 mag. by him and sometimes 8.5, were not continuously visible in the field, and at times disappeared and reappeared, but were seen well enough to observe when near the wire.

My first screen observations May 23-July 30 gave the following result: 46 observations through two screens gave the mean *faint - bright* = + 0.045 essentially the same result as that of G. C. C.

These were all made with a very faint illumination of the wires. Arranging them in the order of their reduced mags. as seen through two screens, we find for two screens:

Reduced Magnitude.	Faint— Bright.	Number Observations.	
6.0 to 6.5 inclusive	+ 0. ^s 020	7	} (E. S. H.)
6.6 to 7.0 inclusive	+ 0. 039	17	
7.1 to 7.5 inclusive	+ 0. 053	13	
7.6 to 8.0 inclusive	+ 0. 039	7	

The probable error of the last line is very great. In a general way these results agree with those of G. C. C. And I believe them to be totally useless as corrections to be applied to the R. A. of the 303 stars.

During September, October and November 1885, I made two new series of screen observations. In the new series all the observations were made through 2 screens, thus reducing the magnitude by 4.0. The field was made faint before the star entered. When the star entered its reduced magnitude was estimated. It was observed over 5 wires through the screens; the field was then made of the brightness usually employed in observations of stars of 1-3 magnitude, and the star's transits over the last 5 wires were observed. All of these observations were made with faint star before bright star. This course was necessary. Errors due to always observing faint before bright, still remain. In the first new series the magnifying power was 139; in the second, 174.

The result of the first series is as follows. From the mean of 51 observations *faint — bright* = + 0^s.072 ± 0^s.0098. Arranging the stars in the order of their reduced magnitudes as seen through two screens.

Reduced Magnitude.	Faint— Bright.	Number Observations.	
5.0 to 6.0 inclusive	+ 0 ^s .046 ± 0 ^s .017 (5)		} (E. S. H.)
6.1 to 7.0 inclusive	+ 0 .044 ± 0.011 (18)		
7.1 to 8.0 inclusive	+ 0 .083 ± 0.016 (24)		
8.1 to 9.0 inclusive	+ 0 .140 ± 0.039 (4)		

The result of the second series is as follows: From the mean of 25 observations *faint—bright* = $+ 0^{\circ}.074 \pm 0^{\circ}.0104$. Arranging the stars in the order of their reduced magnitudes as seen through two screens.

Reduced Magnitude.	Faint — Bright.	Number Observations.	
5.0 to 6.0 inclusive	$+ 0^{\circ}.017 \pm$	$0^{\circ}.028$ (8)	} (E. S. H.)
6.1 to 7.0 inclusive	$+ 0. 076 \pm$	$0. 013$ (14)	
7.1 to 8.0 inclusive	$+ 0. 090 \pm$	0.018 (8)	

In a thorough investigation, the effect of the steadiness of the star's image should be included. It is my opinion that the numerical results are greatly influenced by the steadiness, but I have not been able to secure a sufficient number of observations to demonstrate this.

The preceding are all the screen observations which a long continuance of cloudy weather and my enforced absences from Madison on business connected with the Lick Observatory, allowed me to make. They are probably not sufficient to give a trustworthy determination of my screen constants. The observations of Mr. COMSTOCK are probably worthless for the purpose for which they were made, as are my own, also, observed between May 23 and July 30.

Under the circumstances I prefer to print Mr. COMSTOCK's and my own right-ascensions precisely as they were observed, without applying any correction for magnitude.

IV. LATITUDE OF THE WASHBURN OBSERVATORY.

In *Publications* of the Washburn Observatory, Volume III, p. 2, it was stated that the different determinations of the latitude given in the accompanying table were in progress.

Nos. 1, 2, 12, 13, will receive a new discussion from the U. S. Coast and Geodetic survey (*a*) employing our 1885 observations of the stars observed, as the modern authority,* and (*b*) using our observations only. The discussion (*b*) will give a latitude which must be employed with our meridian circle observations in order to reproduce the system of the *Berliner Jahrbuch*, within the limits of declination used. Latitudes 3, 4, 5, have been printed in our *Publications*, Volume III.

Latitudes 6 and 7 are to be derived from the combination of our nadir observations with the declinations of fundamental stars observed in connection with the 303 and refraction lists. Their probable accidental errors will, of course, be large, but they will have interesting relations with other discussions of absolute declinations. This part of the work is completed to the beginning of 1885, but is not printed here since it will have no value until the whole series is completed. Latitudes 8, 9, 10, 11, are now short series of observations of the absolute Z. D. of *Polaris*. In order to utilize these, it will be absolutely essential to investigate the division errors of the circle for the nadir readings and for the readings for *Polaris* U. C. and L. C. They should also be kept up for some years. There does not appear to be any *certain* relation between the deduced latitude and the value of the factor $B + T$ of the refraction.

*One of these stars has been kindly observed for us at the Harvard College Observatory, as it culminated too close to others to allow us to observe it in the time at our disposal.

DIFFERENT DETERMINATIONS OF THE LATITUDE.

NO.	DATE.	OBSERVER.		INSTRUMENT.	METHOD.
		Name.	Institution.		
1	*1873..	F. BLAKE	U. S. Coast Survey....	Zenith Telescope No. 2.	TALCOTT'S (12 pairs of stars from B. A. C.).
2	*1881..	G. C. COMSTOCK	Washburn Observatory	Fauth Zenith Telescope	TALCOTT'S (26 pairs of stars from SAFFORD'S Cat.)
3	*1894..	E. S. HOLDEN .	Washburn Observatory	Fauth Zenith Telescope	TALCOTT'S (10 pairs of stars from B. J. and BOSS).
4	*1884..	G. C. COMSTOCK	Washburn Observatory	Fauth Zenith Telescope	TALCOTT'S (11 pairs of stars from B. J. and BOSS).
5	*1884..	G. C. COMSTOCK	Washburn Observatory	Fauth Transit.....	Prime Vertical Transits (69 determinations from B. J. and BOSS).
6	†1884..	E. S. HOLDEN .	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Standard Stars. (B. J.)
7	†1884..	G. C. COMSTOCK	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Standard Stars. (B. J.)
8	*1883..	J. TATLOCK....	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Polaris.
9	†1884-5	E. S. HOLDEN..	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Polaris.
10	†1884-5	M. UPDEGRAFF	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Polaris.
11	†1885..	G. C. COMSTOCK	Washburn Observatory	Repsold Meridian-Circle	From Z. D. of Polaris.
12	†1885..	F. H. PARSONS.	U. S. Coast Survey....	Zenith Telescope No. 5.	TALCOTT'S (Station, University). } Same B. A. C.
13	†1885..	F. H. PARSONS.	U. S. Coast Survey....	Zenith Telescope No. 5.	TALCOTT'S (Station, Observatory). } stars as 1878.

* Those marked with a star are completed and reduced. † Those series marked with a dagger are begun and reduced to date.

† The 24 stars used by the Coast Survey in 1873 were observed on the Meridian-Circle in 1886, each 10 times or more.

LATITUDE FROM Z. D. OF POLARIS.

Although no results can now be drawn from these observations for the reason given above, I collect in the following tables the observations as they stand at this time. It should be remarked that no measures have been made unless the observer considered the images good enough. Hence none of these observations should be rejected in the final discussion.

PROBABLE ERRORS OF A SINGLE BISECTION OF POLARIS IN 1884-5.

In the observations for latitude *Polaris* is bisected on 11 threads and each is separately reduced to the middle thread. The microscopes are read twice during the progress of the bisections, and a nadir is observed immediately before and after the star. The microscopes are read twice for each nadir. The probable error of 1 bisection has been deduced as follows:

<i>Daylight Observations;</i>	<i>Polaris S. P.</i>	Date 1884.
<i>p. e.</i> of 1 bisection = $\pm 0''.28$; Observer H;	wt. 2.	Nov. 16.
= ± 0.38 ; Observer H;	wt. 3-4.	Nov. 6.
= ± 0.17 ; Observer H;	wt. 5.	Nov. 12.
= ± 0.21 ; Observer U;	wt. 3.	Dec. 8.
= ± 0.14 ; Observer U;	wt. 4.	Dec. 3.

That is, the probable accidental error of the mean of 11 bisections even in poor seeing (wt. 2) is not above $0''.1$ and for the best (wt. 5) it is not above $0''.05$.

OBSERVATIONS OF POLARIS.

E. S. H., OBSERVER.

Circle E.

Date.	Day or Night.	Nadirs.		Temperature	Weight.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1884.		"	"	°		"	"	
May 8..	Night.	[36.52]	35.77	+62	3	.....	36.41	303 stars
Nov. 16.	Day..	.....	58.77	+28	2	.....	35.89	
Nov. 17.	Night.	59.82	59.90	+25	2	35.51	.....
Nov. 17.	Day..	58.76	59.21	+25	2	.....	36.84	
Nov. 19.	Day..	58.44	58.79	+30	2	.....	36.63	
Nov. 20.	Night	59.51	59.49	+32	4	35.37	.....
Nov. 27.	Night.	62.78	62.82	+18	4	36.07	.....
Nov. 30.	Night.	61.89	62.02	+18	3	36.30	.....
Dec. 2.	Night.	61.98	61.76	+31	3	36.07	.....
Dec. 3.	Night.	.....	62.04	+36	3	35.13::	.....
Dec. 4.	Night.	61.22	61.28	+34	3	35.96	.....
Dec. 9.	Night.	61.41	61.68	+22	1	36.36	.....
Dec. 10	Night.	61.09	61.42	+26	3	36.15	.....
Dec. 15.	Night.	61.33	61.07	+ 7	1	36.60	.....
Dec. 17.	Night.	64.90	65.05	- 4	4	35.86	.....

OBSERVATIONS OF POLARIS.

E. S. H., OBSERVER.

Circle W.

DATE.	Day or Night.	Nadirs.		Temperature	Weight.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1884.		"	"	°		"	"	
May 27	Night.	36.62	37.01	+53	4	.....	37.65	303 stars.
Oct. 18	Day..	32.21	32.52	+66	1	.....	36.60	
19	Night.	32.76	32.54	+60	1	37.32	.....
19	Day..	32.08	31.91	+67	2	.....	36.97	
20	Night.	32.03	31.85	+52	2	36.59	.....
22	Day..	28.33	27.88	+29	1	.....	37.29	
24	Night.	30.68	30.92	+38	3	36.63	.....
Nov. 1	Day..	19.29	.....	+36	2	.....	36.59	
2	Night.	.....	20.24	+39	4	37.78	.....	Clouds.
6	Day..	19.36	19.88	+43	4	.....	37.69	
7	Night.	19.71	19.87	+42	4	37.13	.....
7	Day..	19.24	19.55	+44	2	.....	37.97	
9	Night.	20.31	20.24	+46	3	37.26	.....
12	Day..	19.81	20.41	+43	5	.....	36.73	
13	Night.	19.93	20.23	+44	4	37.32	.....
13	Day..	20.56	.....	+43	2	.....	38.47	
Dec. 22	Night.	56.03	55.59	- 5	3	37.35	.....

OBSERVATIONS OF POLARIS.

G. C. C., OBSERVER.

Circle W.

DATE.	Day or Night.	Nadirs.		Temperature	Weight.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1884. Oct. 5	Night.	25.35	28.68	+59	3	37.53	.....	303 stars.
10	Night.	32.04	32.62	+51	4	37.95	.....	303 stars.
1885. Feb. 18	Day.	13.27	13.69	+ 7	3	37.33	.....
19	Day.	13.00	13.57	0	3	37.39	.....
20	Day.	12.93	13.21	+ 8	4	37.97	.....
21	Day.	14.62	14.20	+10	2	37.79	.....
23	Day.	13.78	13.76	+20	1	38.25	.....
25	Day.	11.96	11.93	+31	1	38.23	.....

G. C. C., OBSERVER.

Circle E.

1884.								
June 12	Night.	28.49	[28.30]	+68	3	.. ..	35.80	303 stars.
13	Night.	.....	28.81	+61	3	.....	37.41	303 stars.
14	Night.	28.86	[28.15]	+67	4	.....	36.28	303 stars.
Sept. 28	Night.	59.50	57.35	+59	2	35.94	.....	303 stars.
Oct. 2	Night.	59.16	59.33	+69	4	36.64	.....	303 stars.
1885.								
Jan. 30	Day.	51.06	49.46	+16	....	36.46	.....
Feb. 5	Day.	44.14	44.93	+ 4	2	36.89	.....
11	Day.	54.40	53.93	+ 3	3	37.08	.....
14	Day.	51.02	50.85	+ 9	4	36.54	.....
16	Day.	52.83	52.83	- 4	3	36.65	.....

OBSERVATIONS OF POLARIS.

J. T., OBSERVER.

Circle W.

DATE.	Day or Night.	Nadirs.		Temperature	Weight.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1883.		"	"	°		"	"	
Sept. 25	Day ..	29.08	29.45	+50	.....	.....	36.21	
Oct. 15	Day ..	23.82	.....	+47	2	.....	36.23	
16	Night.	26.59	.....	+67	.....	36.54	.....
18	Day ..	25.83	.....	+54	3	.....	36.61	
19	Day ..	24.62	.....	+36	1	.....	36.80	
23	Night.	25.70	.....	+73	2	37.87	.....
Nov. 1	Day ..	23.19	.....	+38	1	.....	37.60	
28	Night.	21.24	.....	+25	.....	37.28	.....
Dec. 4	Night.	22.00	22.37	+36	.....	36.64	.....
4	Day ..	22.30	.....	+32	4	.....	37.12	
8	Night.	25.83	24.85	+25	2	38.81	.....
10	Night.	22.11	22.92	+33	3	37.58	.....
10	Day ..	22.34	.....	+34	2	.....	36.60	

J. T., OBSERVER.

Circle E.

1884.								
July 25	Night.	[54.74]	53.71	+64	.....	37.13	.....
26	Night.	[54.74]	53.29	+65	.....	36.54	.....
27	Night.	[53.80]	54.99	+65	.....	38.15	.....

OBSERVATIONS OF POLARIS.

M. U., OBSERVER.

Circle E.

Date.	Day or Night.	Nadirs.		Temp.	Wt.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1884		"	"	"		"	"	
Nov. 28	Night.	.....	62.97	+14	2	35.56	.....
29	Night.	.....	61.93	+21	5	35.93	.....
Dec. 2	Day ..	60.54,	61.10	+25	3	.....	36.21	
3	Day ..	.....	61.62	+34	4	.....	35.71	
8	Day ..	60.44	60.60	+16	3	.....	36.38	
9	Day ..	60.51	60.56	+26	2	.....	35.91	
19	Night.	67.38	66.93	- 3	1	35.82	.....
1885								
Feb. 26	Day ..	34.59	34.53	+35	3	35.59	.....
Mar. 31	Day ..	42.79	42.79	+47	2	35.84	.....
April 3	Day ..	43.37	42.93	+34	2	35.91	.....
Sept. 1	Day ..	56.42	56.00	+58	1	.....	36.35	
5	Day ..	58.46	58.39	+58	1	.....	36.78	
Oct. 10	Day ..	57.24	57.54	+64	3	.....	36.85	
11	Night.	55.92	55.98	+50	1	36.76	.....
11	Day ..	56.78	57.07	+63	2	.....	36.94	
13	Day ..	56.86	56.67	+49	4	.....	36.13	
14	Night.	56.28	56.20	+42	2	35.97	.....
15	Night.	56.33	56.15	+52	4	35.70	.....
15	Day ..	57.34	57.32	+64	3	.....	37.56	
16	Night.	56.25	56.23	+53	3	35.21	.....
17	Night.	56.00	55.99	+42	3	35.45	.....
21	Day ..	57.55	57.42	+44	4	.....	36.79	
22	Day ..	57.28	57.87	+41	2	.....	36.37	
23	Night.	56.44	56.53	+35	2	36.14	.....
24	Night.	56.56	56.45	+46	3	36.10	.....
24	Day ..	56.67	56.77	+55	3	.....	37.63	

OBSERVATIONS OF POLARIS.

M. U., OBSERVER.

Circle W.

Date.	Day or Night.	Nadirs.		Temperature	Weight.	Seconds of Latitude.		Remarks.
		First.	Second.			U. C.	L. C.	
1884.		"	"	°		"	"	
Nov. 8.	Night	19.37	19.88	+36	2	37.56	.....
Nov. 12.	Night.	.....	20.26	+41	1	36.84	.....
Dec. 24.	Night	53.47	53.29	-3	2	37.70	.....
1885.								
Jan. 9.	Night.	55.02	55.00	+20	3	36.64	.....
Feb. 22.	Day ..	14.62	15.03	+17	4	37.91	.....
April 6.	Day ..	34.32	35.04	+50	2	37.33	.....
July 4.	Day ..	47.42	47.57	+77	3	.....	37.29	
July 6.	Day ..	47.00	46.73	+77	4	.....	37.51	
July 9.	Day ..	48.24	46.42	+75	3	.....	36.86	
July 12.	Day ..	50.55	50.10	+78	3	.....	37.18	
July 13.	Day ..	49.44	49.55	+74	4	.....	36.95	
Oct. 25.	Day ..	32.81	32.92	+60	2	.....	37.31	

V. DETERMINATION OF THE LONGITUDE OF A POINT NEAR THE WESTERN BOUNDARY OF DAKOTAH,

FROM OBSERVATIONS MADE BY D. G. MAJOR, U. S. ASTRONOMER AND SURVEYOR, IN THE FIELD, AND BY PROFESSOR EDWARD S. HOLDEN AT THE WASHBURN OBSERVATORY.

Early in August Mr. D. G. MAJOR who was charged with the determination of the western boundary line of Dakotah, arranged for an exchange of signals between the Washburn Observatory and his station in the field. I agreed to reduce his observations as well as my own.

The western boundary of Dakotah is fixed by law as 27° west of Washington.

27° W. of Washington is $1^{\text{h}} 48^{\text{m}} 0^{\text{s}}.00$,
Madison W. of Washington $0\ 49\ 25.80$,
Boundary W. of Madison $0\ 58\ 34.20$.

The latitude of his station (near Mingusville, Dorsey Co., Montana) was $+47^{\circ} 0' 30''$. 1^{s} of time at that latitude is about 1039.6 feet.

DESCRIPTION OF STATIONS, INSTRUMENTS, ETC.

The station at Madison was the Meridian Circle Room of the observatory. The observer was Professor HOLDEN. The instrument was the REPSOLD Meridian Circle, which was always Circle E. during the work, as other observations required that the circle should not be reversed. The systematic difference Circle E.—Circle W. for this instrument and observer is $+0^{\text{s}}.008$ from 70 observations in 1884. No correction has been applied on this account.

Mr. MAJOR's station was at Mingusville, Dorsey county, Montana. He has not furnished any description of it to me, but I infer that his transit pier was not far from the railway tracks and the observations show very great changes in azimuth which may be due to this proximity.

The pivots of the Wurdemann transit were reported to be equal. One level division was C. 0739. No incomplete transits were sent to me by Mr. MAJOR for reduction.

PERSONAL EQUATION.

There was no opportunity to observe for personal equation either before or after the series, and it has been neglected.

OPERATIONS FOR DETERMINING THE LONGITUDE.

Mr. MAJOR's instrument was set up August 14th, and he obtained observations on August 22nd, ("poor"), August 28th ("unsatisfactory"), September 1st ("fair, but cars passing and disturbing adjustment"), September 4th, ("good"), September 5th, ("became cloudy"). On each of these nights signals were exchanged with Madison at 11 P. M., for 5 minutes each way.

On August 22nd, Mr. MAJOR was able to observe 10 stars in 2 hours; August 28th, 14 stars in 7 hours; September 1st, 22 stars in 6 hours; September 4th, 19 stars in 5 hours; September 5th, 15 stars in 6 hours. The results would have been better if the observing nights had been shorter.

Observations at Madison were made on August 10, 13, 14, 15, 16, 17, 18, 21, 25, 26, 28, 29, 30, 31 and on September 1, 4, 5. All stars at Madison were selected from the B. J. Mr. MAJOR, owing to cloudy weather, took any available stars from the B. J. and the American Ephemeris.

The weather at Mr. MAJOR's station was decidedly unfavorable during the whole series and the observations were much disturbed by passing trains on the railway.

The azimuth invariably changed on reversal, and was not constant even while the clamp was unchanged.

The collimation was determined in the field by reversals on a polar star. The following table gives the values thus found.

My opinion is, that Mr. MAJOR's transit instrument was never stable for more than a comparatively short period.

The collimation derived from the time stars has been used.

WURDEMANN TRANSIT; COLLIMATION, CLAMP W.

Date, 1885.	Collimation from Reversal on Polars.	Collimation from Time Stars only.	Collimation adopted.
August 22.....	^s -0.307	^s -0.266	^s -0.26
August 28.....	-0.401	-0.36	-0.36
Sept. 1.....	-0.184	-0.121	-0.124
Sept. 4.....	+0.071	-0.123	-0.123
Sept. 5.....	-0.013	.....	-0.123

AZIMUTHS ADOPTED.

Date.	Clamp.	Azimuth.	Change of Azimuth.
1885.			
Aug. 22...	CL W.....	+9. 31	..... } -0. 80
Aug. 22...	CL E.....	+8. 51	
Aug. 28...	CL W....	+6.307	..... } -0.63
Aug. 28...	CL E.....	+5.673	
Sept. 1...	CL W.....	-2.45	From 5 ^h . 31 ^m . to 7 ^h . 35 ^m . } -0.67
Sept. 1...	CL E.....	-2.54	
Sept. 1...	CL E.....	-3.21	From 7 ^h . 45 ^m . to 8 ^h . 14 ^m . } -0.70
Sept. 4...	CL E.....	-1.66	From 5 ^h . 32 ^m . to 6 ^h . 46 ^m . } -0.70
Sept. 4...	CL W.....	-1.46	
Sept. 4...	CL W.....	-2.16	From 7 ^h . 15 ^m . to 8 ^h . 2 ^m . }
Sept. 5...	CL W.....	-3.62	
Sept. 5...	No reversal	.....

There appears to have been some systematic cause for the change of azimuth.

The observations were partially reduced in the field by Mr. MAJOR, and subsequently at Madison, from copies of the originals, which were sent us. As the azimuth usually varied, and the nights were very long, owing to clouds, the following method was adopted. The transits were first corrected for level and rate, and then four equations formed:

$$\begin{array}{ll}
 \text{The time stars Cl. W. gave R. A. } - (T+Bb) = \Delta T + A(a+\Delta a) + Cc, & \\
 \text{The polar stars Cl. W. gave} & = + A(a+\Delta a) + Cc, \\
 \text{The time stars Cl. E. gave} & = + A(a-\Delta a) - Cc, \\
 \text{The polar stars Cl. E. gave} & = + A(a-\Delta a) - Cc.
 \end{array}$$

in which c is the collimation, $a+\Delta a$ the azimuth clamp W, $a-\Delta a$ the azimuth clamp E. The four equations gave preliminary values of ΔT , a , Δa and c . With the value of c , the observations were divided into groups and separate values of a formed. The solutions were repeated two and three times when necessary, and the concluded chronometer corrections are within less than 0.01 of the truth. Thus the law of the variation of a was determined.

The following tables give the results of the observations:

MADISON CLOCK = HOHWU 33.

Date.	Epoch Face of H.			Observed H Δ T. [Interpol- ated.]	Daily Rate between groups.	Hourly Rate Adopted.	No. of Time Stars.	No. of Polar Stars.	REMARKS.
1885	h.	m.	s.	s	s	s			
Aug. 18	19	0	0	-27.739	.....	.....	10	3	
18	22	0	0	-27.911	-1.375	-0.0573	9	3	
21	20	0	0	-32.052	-1.420	-0.0592	10	3	
22	21	16	0	[-33.540]	.....	.....	.....	.....	Signals received.
22	21	26	0	[-33.551]	.....	.....	.....	.....	Signals sent.
25	20	0	0	-37.707	-1.414	-0.0539	10	3	
26	19	0	0	-33.864	-1.207	-0.0503	10	3	
28	19	0	0	-41.370::	-1.253::	.....	2	1	Cloudy.
28	19	0	0	[-41.408]	.....	.....	.....	.....
28	21	58	37	[-41.566]	.....	.....	.....	.....	Signals received.
28	22	7	30	[-41.574]	.....	.....	.....	.....	Signals sent.
28	22	0	0	-41.567	-1.272	-0.0530	14	3	{ Rate referred to August 26.
Sept. 1	20	36	0	-46.843	.....	.....	9	3	
1	21	52	30	[-46.914]	.....	.....	.....	.....	Signals received.
1	22	14	30	[-46.934]	.....	.....	.....	.....	Signals sent.
1	22	52	0	-46.968	-1.321	-0.0552	13	2	
4	22	6	0	[-50.816]	.....	.....	.....	.....	Signals received.
4	22	19	30	[-50.827]	.....	.....	.....	.....	Signals sent.
4	23	10	0	-56.867	[-1.143]	[-0.0476]	13	3	{ Cloudy before 22h. Rate assumed to agree with September 5.
5	20	40	0	-51.920	-1.178	-0.0490	10	3	
5	21	43	0	[-51.941]	-1.143	-0.0476	.....	.....	Referred to Sept. 4.
5	22	7	30	[-51.949]	.....	.....	.....	.....	Signals received.
5	22	18	0	[-51.952]	.....	.....	.....	.....	Signals sent.
5	22	46	0	-51.962	-0.469	-0.0195	11	2	Referred to Sept. 5.

MAJOR'S CHRONOMETER=NEGUS 1684.

Date. 1885.	Epoch. Face of Chrono- meter.	Observed Chron. Δ T. [Interpolated.]	Daily Rate be- tween groups.	Hourly Rate. Adopted.	No. of Time Stars.	No. of Polar Stars.	Clamp.	REMARKS.
Aug. 22	h. m. s. 3 49 0	h. m. s. [-7 31 23.76]	s.	s. .....	.....	.....	.....	Signals sent.
22	3 58 0	-7 31 23.78	.....	.....	.....	.....	.....	Signals received.
22	7 23 —	-7 31 24.24	[-3.241]	[-0.1351]	8	2	W. E.	Rate assumed.
22	Cloudy:	very unsatisfactory observations	and very few	stars.	.....	.....	.....	.....
28	4 30 —	[-7 31 41.173]	.....	.....	.....	.....	.....	Signals sent.
28	4 40 —	-7 31 41.196	-3.241	-0.1351	10	3	W. E.	Signals received.
28	Observations extend	over 6h.	53m. and	are un-	satisfactory.	.....	.....	.....
Sept. 1	3 0 0	-7 31 53.16	-3.042	-0.1263	10	2	W.	.....
1	4 24 30	[-7 31 53.336]	.....	.....	.....	.....	.....	Signals sent.
1	4 46 30	[-7 31 53.383]	.....	.....	.....	.....	.....	Signals received.
1	8 1 0	-7 31 53.79	-3.024	-0.1263	2	2	E.	Azimuth cl. E. changed 0° 7.
1	Fair observations but	transpassing distur-	adjustments.	.....	.....	.....	.....	.....
4	3 39 0	-7 32 2.770	.....	.....	9	2	E.	.....
4	4 39 0	[-7 32 2.894]	.....	.....	.....	.....	.....	Signals sent.
4	4 51 0	[-7 32 2.919]	.....	.....	.....	.....	.....	Signals received.
4	6 56 0	-7 32 3.182	-2.938	-0.1224	5	4	W.	Referred to Sept. 4.
4	Good observations.	.....	.....	.....	.....	.....	.....	.....
5	3 14 0	-7 32 5.524	.....	-0.1158	.....	.....	.....	Referred to Sept. 4.
5	4 40 30	[-7 32 5.691]	.....	.....	.....	.....	.....	Signals sent.
5	4 50 0	[-7 32 5.709]	.....	.....	.....	.....	.....	Signals received.
5	Cloudy.	?	.....	.....	.....	.....	.....	.....

LONGITUDE OF A STATION NEAR THE BOUNDARY OF DAKOTA, WEST OF MADISON.

[The Boundary-Line is 0h. 58m. 34s. 20, West of Madison.]

DATE.	SIGNALS RECEIVED AT MADISON.		SIGNALS SENT FROM MADISON.		Difference of Sig- nals.	Longitude of Sta- tion West of Madison.	Wave and Armo- ture time.
	H. Clk. No. 32 + Correction.	Chron. 1684 + Correction.	H. Clk. No. 32 + Correction.	Chron. 1684 [†] + Correction.			
1885							
Au. 22	h. m. s. 21 15 42.926	h. m. s. 20 [16] *36.24::	h. m. s. 21 25 10.450	h. m. s. 20 26 10.05 ::	m. s 59 6.69	m. s.	s.
Au. 22	.....	.....	.....	.....	59 6.40	59 6.55 ::	0.143
Au. 28	21 57 55.334	20 53 48.827	.....	.....	59 6.507	.....	.....
Au. 28	.....	.....	22 6 48.426	21 7 42.207	59 6.219	59 6.363	0.144
Sep. 1	21 51 43.066	20 52 36.839	.....	.....	59 6.247	.....	.....
Sep. 1	.....	.....	22 13 43.066	21 14 36.767	59 6.299	59 6.273	-0.026
Sep. 4	22 5 3.806	21 [5]* 57.106	.....	.....	59 6.700	.....	.....
Sep. 4	.....	.....	22 18 9.173	21 19 2.731	59 6.442	59 6.571	0.129
Sep. 5	22 8 0.965	21 8 54.309	.....	.....	59 6.656	.....	.....
Sep. 5	.....	.....	22 17 8.048	21 18 1.691	59 6.357	59 6.507	0.150

The probable errors of the *concluded* *4t* are as below:

MADISON;	MAJOR;	Prob. Error of Long.
August 22 Cloudy	$\pm 0^s .036^{\dagger}$	.....
August 28 $\pm 0^s .013$	$\pm 0 .026$	$\pm 0^s .029$
Sept. 1 $\pm 0 .010$	$\pm 0 .038$	$\pm 0 .039$
Sept. 4 $\pm 0 .014$	$\pm 0 .033$	$\pm 0 .036$
Sept. 5 $\pm 0 .005$	$\pm 0 .051$	$\pm 0 .051$

FINAL RESULTING LONGITUDE.

It is somewhat doubtful what weights should be assigned to the various results which are discordant. I give the weight zero to August 22, as the hourly rates of both time pieces are unknown, and as the epoch of exchange of signals is three hours distant from the epoch of the time determination by Mr. MAJOR. September 1, I also reject since the transmission time is negative, and since the observations by Mr. MAJOR were much disturbed by passing trains. August 28 and September 4 I give wt. = 2 and September 5 wt. = 1. The longitude then is $0^h 59^m 6^s.49 \pm 0^s.046$ West of Madison.

* MAJOR's minute is 1m. too large. The Madison minute is right as it was checked by the reading of a mean time clock.
† Rate assumed.

VI. CORRECTIONS TO THE STAR CATALOGUES CONTAINED IN THE LIBRARY OF THE WASH- BURN OBSERVATORY.

It has been my endeavor to make the collection of star-catalogues in the Library of the Observatory as complete as possible.

To this end, most of the principal catalogues attainable have been bought, and as far as practicable all errata known to me have been inserted in the body of the books themselves. A number of star-catalogues I have not yet been able to purchase.

The very considerable labor which these corrections have cost has already been more than repaid to me.

At the beginning of each catalogue I have briefly indicated the sources from which the errata have been copied; so that every erratum entered can be verified from the original, if desired.

It appears to me that these lists of original sources from which the errata are taken may be of use to others besides myself, and I therefore give in what follows a copy of the memorandum inserted at the beginning of each of our star-catalogues. In general, no references to errata printed in the work itself are mentioned, though I have sometimes quoted them for my own convenience. I am aware that such a list as this cannot be complete at its first publication, and I shall be extremely obliged if errors or omissions are communicated to me.

AIRY's Catalogue of 1439 Stars:—

Mem. R. A. S. vol. 19, p. 136, Table of proper motions.

AIRY's XII year catalogue of 2156 stars:—

See its p. xv;

See also p. cxxi of the VII year catalogue. See Mem. R. A. S., vols. 28 [not owned by Observatory] and 19, p. 137, Table of proper motions.

AIRY's VI. year catalogue of 1576 stars:—

See its p. cxviii.—See also p. cxxiii of the VII year catalogue. See Mem. R. A. S., vol. 19.

AIRY'S VII year catalogue of 2022 stars:—

See p. (i) of new VII year catalogue. A slip of errata should be found pasted in between its own pp. ii. iii. See Mem. R. A. S., vol. 33, p. 61 [not owned by Observatory]. See V. J. S. 1880, p. 45.

AIRY'S new VII year catalogue of 2760 stars:—

p. (i) of the catalogue has a list of errata and a slip with errata to Nos. 185, 469, 1541, should be pasted in;

See V. J. S. 1871, p. 117;

See IX year catalogue, p. 23.

AIRY'S IX year catalogue of 2263 stars:—

See its own p. 23;

See A. N. 2676 (192).

ARGELANDER'S Northern Zones:—

(Bonner Beob. I.)

See Bonner Beob. V, p. I.

ARGELANDER'S Southern Zones:—

(Bonner Beob. II.)

See Bonner Beob. VI, p. [8]; VII, p. 519.

ARGELANDER'S *Durchmusterung*: (Bonner Beob. III, IV, V.)

See Ast. Nach. Nos. 1695 (240); 1708 (55); 1765 (202-208); 2174 (217-8); 2325 (333); 2396 (305); 2418 (282); 2429 (69); 2459 (169); 2514 (288); 2527 (97-102); 2567 (359); 2578 (159); 2605 (207); 2610 (279); 2659 (295-6); 2666 (37);

See Bonner Beob. III p. xxvi; IV p. xlviii; V, p. xxxiv; VI, p. 376; VII, p. 519.

ARGELANDER'S Bonner Beob. vol. VI:—

See its own p. 380; also Vol. VII, p. 520;

See A. N. 2578 (159); 2580 (187); 2609 (270); 2610 (279); 2655 (231); 2656 (248);

See V. J. S. 1877, p. 53;

PAUL (ms.) p. 17, for 2897 read 2887.

ARGELANDER'S Bonner Beob. vol. VII:—

See its own p. 523.

See V. J. S. 1870 p. 265;

See BISCHOF; Untersuch. u. d. Eigenbewegung des Sonnensystems, etc., Bonn. 1884. [Not owned by observatory].

ARGELANDER'S Uranometria Nova (text):—

See Annals H. C. O. vol. IX; p. 28;

See A. N. vol. 26 (313) [not owned by observatory].

D'ARREST Siderum Neb. Obs. Hav.:—

See V. J. S. 1868, p. 94.

AUWERS' Fundamental Catalogue (I):—

See V. J. S. 1879, p. 435; 1880, p. 286.

AUWERS' Fundamental Catalogue (II):—

See V. J. S. 1883, p. 217.

BAILY'S B. A. C. :—[Not owned by Washburn observatory].**BAILY'S LACAILLE:—**

See A. N. 2498 col. 21;

See Bonner Beob. VII, p. 245;

See Nature, March 22, 1883, p. 498;

See STONE'S Cape Catalogue 1880, p. 556, and foot notes throughout.

BAILY'S LALANDE:—

See Bonner Beob. VII, p. 213;

See SCHJELLERUP, 10,000 stars, p. 225 et seq ;

See Copernicus, vol. II, p. 148;

See ROBINSON, 1,000 stars, p. 132;

See BOLTE, Untersuch. u. d. Praec. Const. 1883, p. 12 [Not owned by observatory];

See V. J. S. 1878, p. 174;

See A. N. 657; 2,036 (306-7); 2,590 (187); 2,583 (277); 2,652 (184); 2,655 (234);

See also Nos. 15,551, 20,163, 24,043, 26,261, 27,274, 28,590, 28,607, 28,644, 28,986.

(BERLIN): Catalogue zu den 24 St. der Akademische Stern Karten:—**BIRMINGHAM'S Red Stars:—**

See its own p. 354.

BOSS' Declinations of Fixed Stars:—**CARRINGTON'S Redhill Catalogue:—****COOPER'S Ecliptic Stars:—**

See its own vol. I, pp. ii and 225; vol. II, p. 229; vol. IV, p. 225 *et. seq.*

See CARRINGTON, p. 151.

COPELAND and BORGES Zone Catalogue (-0° and -1°):—

See its own, p. 147.

See V. J. S., 1870, p. 197.

DIEN'S Atlas Céleste:—

See V. J. S., 1874, p. 144.

ELLERY'S First Melbourne Catalogue.—

See V. J. S., 1869, p. 90; and 1876, p. 178.

See Mon. Not. R. A. S., Vol. 42, p. 308.

FEDORENKO'S Lalande:—

See Bonner Beob. VI, p. [22].

See A. N. 2304. (380).

- GILL'S Cape Catalogue of 4810 stars (1850):— [Not owned by Observatory].
See its own p. i.
- GILLISS' 1963 stars:—
See V. J. S., 1872, p. 462.
- GOULD'S D'AGELET:—
See V. J. S., 1867, p. 2.
- GOULD'S Cordoba Zone-Catalogue:—
[Not owned by the Washburn Observatory].
See A. N., 2659 (308); 2688 (407).
- GOULD'S Uranometria Argentina, (text):—
See its last fly-leaf.
See V. J. S., 1880, p. 272:
See A. N. 2, 377 (8).
- GRANT'S Glasgow Catalogue:—
See V. J. S., 1884, p. 180 and p. 202.
See A. N. 2, 655 (230, note).
- GROOMBRIDGE'S Circumpolar Stars:— [not owned by Washburn Observatory].
See Bonner Beob. VI, p. [26].
See first fly-leaves of Radcliffe I.
See OELTZEN'S Ergänzungen, etc., p. 934.
- HARVARD College Zones (Annals H. C. O., vol. ii):—
See V. J. S. 1868, p. 117.
- HEIS Atlas coelestis novus (text):—
See Annals H. C. O., Vol. IX, p. 29.
See V. J. S. 1873, pp. 67, 278; 1874, p. 236; 1878, p. 111.
- HERSCHEL'S G. C. of Nebulæ, etc.:—
(A 2nd supplement is in preparation by DREYER.)
See V. J. S., 1866, p. 176.
- HERSCHEL'S 10,300 Double Stars (MAIN and PRITCHARD):—
See V. J. S., 1876, p. 64.
- JOHNSON'S Radcliffe Catalogue (Radcliffe I):—
See its own first fly-leaves.
See Bonner Beob. VI, p. [28].
- LACAILLE'S Coelum australe stelliferum [not owned by the Washburn Observatory]:—
See Bonner Beob. VII, p. 240.
- LALANDE'S Histoire Céleste Française [not owned by the Washburn Observatory]:—
See Bonner Beob., VII, p. 179.

LAMONT 9412 stars $+ 3^{\circ}$ to -3° :—

See corrections at end of book;

See LAMONT's 6323 stars, p. 371;

See LAMONT's 5563 stars, p. 357 *et seq.*;

See V. J. S. 1874, p. 94 *et seq.*;

See A. N. 2325 (333); 2588 (376).

LAMONT's 4793 stars -3° to -9° :—

See its own p. 263 and p. 275;

See LAMONT's 5563 stars p. 357 *et seq.*;

See V. J. S. 1874, p. 94 *et seq.*;

See A. N. 2325 (334).

LAMONT's 6323 stars $+ 3^{\circ}$ to $+ 9^{\circ}$:—

See its own p. 338; also p. 393;

See LAMONT's 5563 stars p. 357 *et seq.*;

See V. J. S. 1874 p. 94 *et seq.*

LAMONT's 3571 stars $+ 9^{\circ}$ to $+ 15^{\circ}$:—

See its own pp. 183 and 224;

See LAMONT's 5563 stars p. 357 *et seq.*;

See V. J. S. 1874, p. 94 *et seq.*;

See A. N. 2655 (231).

LAMONT's 4093 stars -9° to -15° :—

See its own pp. 214 and 350;

(Note: p. 351 for 2769 read 2796).

See LAMONT's 5563 stars p. 358 *et seq.*;

See V. J. S. 1874 p. 94;

See A. N. 2325 (334).

LAMONT's 5563 stars north of $+ 15^{\circ}$ and south of -15° :—

See its own p. 335 and p. 354.

See V. J. S. 1874, p. 94 *et seq.*;

See A. N. 2325 (334).

HOWE (MS.) p. 99, No. 156; See; LL 19967-8 and 2 Albany Z. obs.

MAIN's Radcliffe Catalogue (Radcliffe II):—

See a slip of errata bound in before its own p. V;

See V. J. S. 1879, p. 292; p. 300 foot note;

See A. N. 2172 (190).

NEWCOMB's 1098 Standard Stars:—

OELTZEN's ARGELANDER's Northern Zones:—

[Not owned by the Washburn Observatory.]

OELTZEN's ARGELANDER's Southern Zones:—

See its own pp. 432, 437;

See A. N. 2608 (249); 2650 (156); 2661 (331).

OELTZEN'S SCHWEDT'S Circumpolar Stars:—

See CARRINGTON p. 143 *et seq.*

PLAZZI's new Catalogue (1814):—[not owned by the Washburn observatory].

See Bonner Beob. VI, p. [36].

ROBINSON'S Armagh Catalogue:—

See its own p. 837;

See V. J. S. 1873, p. 179;

See A. N. 1421 (77); 1514 (31-2); 1924 (61);

See 7 *Cygni* p. 491 N. P. D.?

ROBINSON'S 1000 stars:—

See its own pp. 131-2.

ROGERS' 1213 stars:—

RUEMKER'S 12000 stars:—

See Bonner Beob. VI, p. [33];

See COOPER'S Ecliptic Stars vol. IV, p. 229;

See OELTZEN'S Ergänzungen, etc. pp. 932-3;

See A. N. 2064 (388).

RUEMKER'S "Neuer Folge":—

See Bonner Beob. VI, p. [35];

COMSTOCK (ms.) No. 564 Dec. — 1°?

No. 2464 Dec. — 10' to agree with 2 Cambridge (Eng.) Z. Obs.

SAFFORD'S 2018 stars:—

SANTINI'S first and second Catalogues:—

[Not owned by the Washburn Observatory.]

See Bonner Beob. VI, p. [35].

SANTINI'S 2706 stars:—

See its own p. 84.

SCHJELLERUP'S AL SUFI, etc.:—

See Mon. Not. R. A. S. vol. 43, p. 286.

See Annals H. C. O. vol. ix, p. 48 *et seq.*

SCHJELLERUP'S 10000 stars:—

See its own p. 225 (N. B. in note to No. 5858 for +5' read -5').

See Bonner Beob. vi, p. [36].

See V. J. S., 1870, p. 210; 1877, p. 52.

See A. N. 2647 (103).

See *Copernicus* vol. ii, p. 148.

See BOLTE, untersuch. u. d. Praec.—Constant 1883, p. 11.

See ROBINSON'S 1000 stars p. 131.

SCHJELLERUP'S Genäherte Oerter, etc.:—

See its p. 39 and also p. 40.

STONE'S Cape Catalogue of Stars (1840):—

See STONE'S Cape Catalogue 1880, p. 562.

STONE'S Cape Catalogue of 1159 stars:—(1860).

STONE'S Cape Catalogue of 12441 stars:—

See its own p. 556 *et seq.*;

See a leaf of errata accompanying each copy;

See *Nature*, March 22, 1883 p. 498.

See A. N. 2668 (63); 2498 (21),

STRUVE'S Positiones Mediae:—

See BONNER Beob., VI., p. [29].

See Notes Schjellerup 10000 stars.

See OELTZEN'S Ergänzungen, etc., p. 934.

TACCHINI'S 1001 stars:—

Original is in Bull. Met. R. Oss. Palermo 1867 *et seq.* Reduced and freed from errata as far as known, in Publ. Washburn Observatory vol. III, p. 41.

TAYLOR'S Madras Catalogue:—

[Not owned by the Washburn Observatory].

See Bonner Beob., VI, p. [39].

TRETENARO'S 1425 stars, 0° to -3° :—

[Not owned by the Washburn Observatory].

See V. J. S., 1872, p. 23.

WASHINGTON Zones:—

(New reduction in progress.)

WEISSE'S BESSEL'S Zones, $+15^{\circ}$ to $+45^{\circ}$:—

See its own p. 287 *et seq.*, 297 *et seq.*

See Bonner Beob. IV., p. I; V, p. XXXII;

See A. N. 1026 (276); 2564 (323); 2530 (187).

WEISSE'S BESSEL'S Zones $+15^{\circ}$ to -15° :—

See its own p. 247 *et seq.*;

See WEISSE'S BESSEL'S Zones $+15^{\circ}$ to $+45^{\circ}$, p. xlv, *et seq.*;

See COOPER'S Ecliptic Stars, vol. iv, p. 230, *et seq.*;

See Annals H. C. O., vol. I part II, p. lviii;

See SCHJELLERUP, 10000 stars, p. 225 *et seq.*;

See RUNKLE in GOULD'S Ast. Jour., vol. 3, p. 115, where all the errata in the Ast. Nach. to 1853, June, are given;

A. N. 1509 (327); 2644 (64); 2652 (183); 2679 (259);

V. J. S., 1879, p. 121.

FRISBY (ms.). Nos. 32, 33 Hora V. interchange signs of Dec;

PAUL (ms.). 17h, Nos. 8, 58, 199: 22h, No. 989.

See also Mèl. Math. et Astron. iv, p. 600.

See Bonner Beob. iv, p. I, V, p. XXXII.

YARNALL's Catalogue (2d edition):—

See its own p. 281;

See errata in vols. of Wash. Ast. Obs. since 1876;

See V. J. S. 1880, p. 44;

See A. N. 2056 (249); 2325 (334); 2480 (93); 2561 (261 *et seq.*); 2567 (371); 2614 (346); 2652 (184); 2668 (55);

See MILLOSENICH, Sulle Stelle * * * "Anon" del Catalogo di YARNALL (1885);

See GILL and ELKIN, Stellar Parallax in S. Hemisphere, p. 141.

VII. RESULTS OF MERIDIAN-CIRCLE OBSERVATIONS IN THE YEARS 1884 AND 1885, AT THE WASHBURN OBSERVATORY.

The following pages contain the mean places for 1884.0 and 1885.0 of all stars observed at the Washburn Observatory with the REPSOLD Meridian-Circle from May 1, 1884, to October 22, 1885.

The observing list contains

- (a) Stars from the *Berliner Jahrbuch*; these are known by their names only, marked with an asterisk. The places contain proper motions.
- (b) Stars of the list of 303 fundamental stars for the southern zones of the *Astronomische Gesellschaft*; these carry the numbers 1.....303. The B. J. stars include proper motions.
- (c) Leyden and Cape of Good Hope Refraction Stars; these are designated by name.
- (d) Northern (circumpolar) refraction stars; these are always S. P. stars, from the *Berliner Jahrbuch*.
- (e) 23 latitude stars observed for the U. S. Coast and Geodetic Survey; these have their B. A. C. numbers given. Their R. A.'s lie between 17^h 29^m and 20^h 29^m.
- (f) Stars of the heliometer-zones of the German Transit of Venus Commission. These are known as AUWERS Nos. 1....19.
- (g) Miscellaneous stars; these have their catalogue names. They have been observed for various reasons, often as comparison stars to *Polyhymnia*=(33).

The observers are H = Professor HOLDEN, C = Mr. COMSTOCK, U = Mr. UPDEGRAFF.

The data given are, in order — *first*, the date; *second*, the observer; *third*, the mean R. A. for 1884 or 1885; *fourth*, the mean Dec. for 1884 or 1885; *fifth*, the position of the instrument. The sign : *x* after a R. A. indicates that the chronographic signal was imperfect. See ante, p. 33. Every observation taken is printed. Every observation is reduced from the data of the observing-books *unchanged*, except that the following corrections have been made:

CORRECTIONS MADE IN THE DATA OF THE OBSERVING BOOKS
ARBITRARILY, OMITTING THE CASES WHERE THE WRONG
MICROMETER WIRE WAS EMPLOYED ($S=2r$, $4=2' 34''$).

Date. 1884-5.	Star.	Correction introduced.	Obser- ver.	Remarks.
1884.				
May 19.	214	+1.000 rev.	Hn.	
May 19.	219	+1.000 rev.	Hn.	
May 30.	178	-0.050 rev.	Hn.	
June 6.	ϵ Cass.	-0.100 rev.	C.	
June 6.	208	-1.000 rev.	C.	
June 7.	190	-0.300 rev.	C.	
June 10.	215	-0.050 ? rev.	C.	Corr. doubtful. ?
June 21.	24 Cephei.	-2' 0".00	C.	Setting.
June 25.	Whole night.	reject. Dec.	C.	
July 18.	255	+0.500 rev.	C.	
July 19.	4 H. Drac.	+1.400 rev.	C.	or wrong wire and 1 rev. ??
July 31.	255	reject. in Dec.	C.	Record illegible.
Sept. 19.	32	+0.050 rev.	C.	
Sept. 20.	8	-0.100 rev.	C.	
Sept. 20.	15	+1.000 rev.	C.	
Oct. 5.	41	+1.000 rev.	C.	
Oct. 10.	ν Persei.	+5.000 rev.	C.	
Nov. 7.	49	+0.050 rev.	Hn.	
Nov. 15.	36	-0.050 rev.	Hn.	
Nov. 18.	38	+0.100 rev.	Hn.	
Nov. 27.	74	-0.050 rev.	Hn.	
Nov. 30.	64	-0.200 rev.	Hn.	
Dec. 3.	δ Persei.	+3.000 rev.	Hn.	
1885.				
Mar. 7.	Whole night.	rejected.	C.	
May 10.	150	-0.400 rev.	Hn.	
May 30.	β Lyrae	-1.000 rev.	C.	
June 18.	Ext. therm.	+1°	C.	
June 21.	σ^3 Urs. Maj. S P.	-2' 0".00	C.	

In this list I have included the names of all stars on our regular observing lists even if these stars have not been observed in 1884 or 1885. The blank spaces will indicate the amount of our work which yet remains undone. It was my intention to reduce each separate observed place to 1875.0 after applying such constant corrections (West — East; difference of observers; U. C. — L. C.; effect of magnitude; division and flexure, etc., etc.) as a full discussion might show to be required. It is clear that it is impossible to do this under the circumstances. I have therefore determined to present the separate observations merely; not even combining them into mean results, as it is not yet certain that the flexures (for example) of 1884 and 1885 are the same.

The deduced places of 1884 and 1885 have been thoroughly revised and are believed to represent our observations truly. The publishing of these results is left to the assistants of the observatory, Mr. UPDEGRAFF and Miss LAMB, who have spared no pains to make the printing correct. After the book was finished they have read every figure with the original and the table of errata contains all corrections found by them. Observations of these stars made since October 23, 1885, by Mr. UPDEGRAFF and Miss LAMB are given in the Appendix.

1. 4 *Ceti*.

1884.									
July	19	C	0	1	47.56	-3	11	42.2	W
	30	C			47.57			41.4	W
Sept.	12	C			47.55			41.0	W
	17	C			47.59			40.7	W
	20	C			47.50			....	E
	24	C			47.71			41.8	E
	28	C			47.69			41.5	E

 β *Cassiopeiae*.*

1885.									
Sept.	14	H	0	3	2.76	+58	30	57.0	E
Oct.	22	H			2.60			55.4	E

 κ^2 *Sculptoris*.

1884.									
Sept.	12	C	0	5	....	-28	26	45.0	W
	17	C			....			46.0	W
	19	C			....			44.6	W
	20	C			....			46.7	E
	24	C			....			46.6	E
	28	C			....			46.9	E

PUBLICATIONS OF THE

2. 7 Ceti.

1884.	.						
Sept. 12	C	0 8	44.79	-19 34	32.8	W	
17	C		44.83		33.5	W	
19	C		44.90		32.8	W	
20	C		44.92		31.7	E	
24	C		44.90		32.5	E	
28	C		44.77		32.6	E	

3. 8 i Ceti.*

1884						
July 19	C	0 13	31.00	-9 28	3.4	W
27	C		31.02		1.6	E
Sept. 12	C		31.04		2.4	W
17	C		31.05		1.9	W
19	C		31.03		1.6	W
20	C		31.04		2.1	E
24	C		31.04		2.0	E
28	C		31.09		2.4	E

i Sculptoris.

1884						
Sept. 28	C	0 15	....	-29 37	23.3	E
Oct. 2	C		....		24.6	E
5	C		....		24.0	W
10	C		....		22.9	W

4. 9 Ceti.

1884						
Sept. 17	C	0 16	55.12	-12 51	18.6	W
19	C		55.14		17.4	W
20	C		55.08		17.4	E
24	C		55.26		17.4	E
1885						
Oct. 22	H		58.34	50	58.4	E

5. LL. 628.

1884						
Sept. 12	C	0 22	31.93	-20 58	24.8	W
17	C		32.01		25.7	W
24	C		32.11		24.4	E
28	C		32.04		24.5	E
Oct. 10	C		32.05		24.4	W
1885						
Oct. 22	H		35.07		3.7	E

6. 12 *Ceti*.*

1884						
July 27	C	0 24	7.10	—4 35	55.0	E
Sept. 19	C		7.16		54.6	W
20	C		7.09		54.6	E
Oct. 5	C		7.14		54.6	W
1885						
Oct. 22	H		10.19		34.6	E

7. P. 0^h, 91.

1884						
Sept. 12	C	0 24	34.62	—24 25	46.7	W
17	C		34.71		46.5	W
28	C		34.57		46.3	E
Oct. 2	C		34.63		47.6	E
10	C		34.62		45.5	W

8. 15 *Ceti*.

1884							
Sept.	12	C	0 32	8.72	—1 8	30.6	W
	17	C		8.69		30.8	W
	20	C		8.80		30.4	E
	24	C		8.66		....	E
	28	C		8.75		29.2	E
Oct.	2	C		8.70		31.0	E
	5	C		8.74		30.6	W

 α *Cassiopeiae*.*

1884							
July 27	C	0 33	55.89	+55 54	3.3	E	
1885							
Oct. 22	H		58.94		23.2	E	

9. 16 β *Ceti*.*

1884							
Sept. 12	C	0 37	45.90	—18 37	25.1	W	
17	C		45.99		26.0	W	
19	C		45.98		25.2	W	
20	C		46.05		24.5	E	
24	C		45.98		24.2	E	
28	C		46.03		25.2	E	
Oct. 2	C		45.96		25.1	E	
5	C		46.04		24.7	W	
10	C		45.95		25.4	W	

21 *Cassiopeiae*,* U. C.21 *Cassiopeiae*,* S. P.

1884.									
May	28	H	0	38	0.54	+74	21	....	W
	30	H			0.71			....	W
June	3	H			0.13			14.4	W
1885.									
May	18	H			4.06			34.3	E
	22	H			4.05			....	E

ζ *Andromedae*. *

1884.									
July	27	C	0	41	11.42	+23	38	6.8	E

ν *Cassiopeiae*.

1884.									
Sept.	19	C	0	42	.....	+50	20	5.4	W
	20	C			.....			6.7	E
	24	C			.....			6.0	E
Oct.	5	C			.....			6.6	W
	10	C			.....			7.1	W
1885.									
Oct.	22	H			.....			26.4	E

10. 19 *Ceti*.

1884.									
Sept.	12	C	0	44	19.00	-11	16	9.4	W
	17	C			18.95			8.6	W
	19	C			19.00			10.3	W
	20	C			18.99			9.6	E
	24	C			18.96			11.4	E
	28	C			18.94			7.7	E
Oct.	2	C			18.97			9.7	E

11. 22 *Ceti*.

1884.									
Sept.	12	C	0	50	12.41	-11	53	42.0	W
	17	C			12.39			42.9	W
	19	C			12.41			42.7	W
	20	C			12.42			42.7	E
	24	C			12.46			43.7	E
	28	C			12.43			41.9	E

12. LL 1691.

1884.							
Sept.	17	C	0 53	0.64	-20 15	....	W
	24	C		0.64		33.9	E
	28	C		0.53		32.1	E
Oct.	5	C		0.58		33.8	W
	10	C		0.53		33.3	W
1885.							
Oct.	22	H		3.57		13.8	E

 α Sculptoris.

1884.							
Oct.	2	C	0 53	....	-29 59	5.8	E

43 H. Cephei,* U. C.

43 H. Cephei,* S. P.

1884.							
May	10	H	0 53	5.45	+85 38	3.9	E
	26	H		4.99		....	W
	27	H		5.33		....	W
	28	H		4.73		....	W
	30	H		5.01		2.8	W
June	3	H		4.45		2.5	W
1885.							
May	21	H		12.93		22.8	E
	23	H		12.80		23.3	E
	25	H		12.76		....	W

Anonymous.

1884.							
Sept.	20	C	0 54	22.72	-20 16	8.6	W

Observer's note: "Star exceedingly faint."

13. 26 Ceti.

1884.							
Sept.	12	C	0 57	50.90	+0 44	41.2	W
	17	C		50.79		41.1	W
	19	C		50.87		40.2	W
	20	C		50.89		40.2	E
	24	C		50.75		39.4	E
	28	C		50.85		41.8	E

14. 81 η Ceti.*

1884.									
Sept. 12	C	1	2	45.25	-10	47	51.5	W	
17	C			45.24			52.0	W	
19	C			45.26			51.6	W	
20	C			45.26			52.4	E	
24	C			45.32			52.1	E	
28	C			45.25			52.2	E	
Oct. 2	C			45.23			51.5	E	
5	C			45.27			51.3	W	
10	C			45.24			51.3	W	

15. 39 Ceti.

1884.									
Sept. 12	C	1	10	43.01	-3	6	40.8	W	
17	C			42.93			41.0	W	
19	C			42.98			40.7	W	
20	C			42.93			....	E	
24	C			42.94			40.3	E	
Oct. 2	C			42.91			40.9	E	

 α Ursae Minoris,* U. C.

1884.									
Sept. 12	C	1	16	14.98	+88	41	....	W	
17	C			13.07			....	W	
19	C			15.80			....	W	
20	C			14.90			....	E	
24	C			13.76			....	E	
28	C			13.79			25.0	E	
Oct. 2	C			15.64			24.5	E	
5	C			15.50			24.1	W	
10	C			13.86			24.5	W	

 α Ursae Minoris,* S. P.

1884.									
May 8	H	1	16	13.37	+88	41	23.6	E	
10	H			....			25.9	E	
27	H			13.58			24.8	W	
June 12	C			....			25.1	E	
13	C			....			25.7	E	
14	C			....			25.0	E	
1885.									
May 21	H			36.94			....	E	
June 1	C			35.00			....	E	

16. 45 *θ Ceti*.*

1884.								
Sept. 12	C	1 18	18.56	-8	46	56.4	W	
17	C		18.57			56.6	W	
19	C		18.53			57.4	W	
20	C		18.50			56.7	E	
24	C		18.44			58.4	E	
1885.								
Oct. 22	H		16.56			37.8	E	

17. 48 *Ceti*.

1884.								
Sept. 12	C	1 24	2.24	-22	13	47.0	W	
17	C		2.25			47.4	W	
19	C		2.23			47.1	W	
20	C		2.15			47.4	E	
24	C		2.33			48.2	E	
1885.								
Oct. 22	H		5.18			28.0	E	

40 *Cassiopeiae*.* U. C.40 *Cassiopeiae*.* S. P.

1884.								
May 13	H	1 29	15.84	+72	26	58.6	E	

18. 50 *Ceti*.

1884.								
Sept. 12	C	1 30	19.57	-15	59	39.9	W	
17	C		19.48			40.3	W	
20	C		19.46			....	E	
24	C		19.60			38.7	E	
28	C		19.52			38.5	E	
Oct. 2	C		19.59			39.1	E	
5	C		19.50			38.5	W	

v *Persei*.*

1884.								
Sept. 19	C	1 30	52.60	+48	2	22.8	W	
Oct. 10	C		.....			23.8	W	
1885.								
Oct. 22	H		56.14			42.6	E	

PUBLICATIONS OF THE

43 *Cassiopeiae**, U. C.

1884.								
Sept. 17	C	1	33	45.77	+67	27	....	W

43 *Cassiopeiae**, S. P.

1884.								
June 6	C	1	33	.....	+67	27	23.2	W
7	C			.....			21.2	W
13	C			.....			22.2	E
14	C			.....			20.5	E

19. 106 ν *Piscium*.*

1884.								
Sept. 12	C	1	35	23.73	+4	53	59.8	W
19	C			23.64			60.3	W
20	C			23.69			60.4	E
24	C			23.75			59.1	E
28	C			23.66			61.2	E
Oct. 5	C			23.73			60.2	W
10	C			23.65			60.2	W

20. P., 1^b, 167.

1884.								
Sept. 19	C	1	40	9.95	-6	18	51.3	W
20	C			9.99			51.4	E
28	C			9.93			51.9	E
Oct. 5	C			9.92			51.0	W
1885.								
Oct. 22	H			13.12			32.5	E

21. [Lac. ϵ *Sculptoris*.*]

1884.								
Sept. 12	C	1	40	12.73	-25	37	58.0	W
17	C			12.62			56.7	W
24	C			12.72			58.0	E
Oct. 2	C			12.79			58.7	E
10	C			12.75			58.8	W

22. 50 ζ *Ceti*.*

1884.								
Sept. 12	C	1	45	44.04	-10	54	31.5	W
17	C			44.03			30.6	W
19	C			44.07			32.2	W
20	C			44.06			31.3	E
24	C			44.07			30.9	E
Oct. 2	C			43.96			31.9	E
5	C			44.02			31.1	W

ϵ Cassiopeiae,* U. C. ϵ Cassiopeiae,* S. P.

1884.						
June 6	C	1 46	.....	+63 5	54.3	W
7	C		.....		54.9	W
12	C		.....		55.5	E
13	C		.....		55.0	E
14	C		.....		53.4	E
1885.						
May 25	H		7.91	6	10.9	W
June 1	C		7.82		10.5	E

23. 111 ξ Piscium.*

1884.						
Sept. 12	C	1 47	33.05	+2 36	50.7	W
17	C		32.99		52.2	W
19	C		33.00		51.6	W
20	C		32.98		51.2	E
28	C		33.04		49.8	E
Oct. 2	C		33.02		51.7	E
10	C		33.07		51.5	W

50 Cassiopeiae,* U. C.

50 Cassiopeiae,* S. P.

1884.						
May 27	H	1 53	32.97	+71 51	34.0	W
28	H		32.93		.....	W
June 3	H		32.82		34.7	W
6	C		.....		34.3	W
7	C		.....		33.4	W
12	C		.....		34.5	E
13	C		.....		34.5	E
14	C		.....		34.9	E

24. 59 ν Ceti.*

1884						
Sept. 12	C	1 54	32.35	-21 38	26.0	W
17	C		32.33		26.4	W
19	C		32.26		26.0	W
20	C		32.41		24.9	E
24	C		32.34		25.3	E
28	C		32.40		25.9	E
Oct. 2	C		32.38		25.8	E
5	C		32.33		26.1	W
10	C		32.40		25.8	W

*γ Andromedæ.**

1884								
Nov. 15	H	1	56	46.87	+41	46	20.0	E
1885								
Oct. 22	H			50.57			38.1	E

25. 61 Ceti.

1884								
Sept. 12	C	1	57	51.87	—0	53	50.4	W
17	C			51.93			51.1	W
19	C			51.85			49.6	W
20	C			51.89			50.2	E
24	C			51.89			49.8	E
28	C			51.91			49.0	E

*α Arietis.**

1884								
Nov. 15	H	2	0	38.12	+22	54	47.5	E

26. 62 Ceti.

1884								
Sept. 12	C	2	3	17.10	—2	52	52.3	W
17	C			17.08			53.1	W
21	C			16.93			52.9	E
Oct. 2	C			17.06			52.6	E

27. Ll. 3979,

1884								
Sept. 19	C	2	3	15.67	—18	19	46.4	W
20	C			15.62			45.4	E
Oct. 5	C			15.71			46.9	W
10	C			15.63			45.2	W
Nov. 15	H			15.62			45.7	E
1885								
Oct. 22	H			18.51			28.4	E

55 Cassiopeiae,* U. C.

55 Cassiopeiae,* S. P.

1885								
May 25	H	2	5	28.23	+65	59	4.7	W
June 1	C			....			4.2	E

28. 67 *Ceti* *.

1884							
Sept.	12	C	2 11	11.83	— 6 57	26.4	W
	17	C		11.86		26.4	W
	19	C		11.85		25.6	W
	20	C		11.88		27.3	E
	24	C		11.77		27.0	E
	28	C		11.82		25.8	E
Oct.	5	C		11.85		26.3	W

29. 68 *o Ceti*.*

2 13 2

Often pointed on but never seen.

W. B.; 2^h; 328. Comparison Star to 33.

1884							
Oct.	2	C	2 15	28.31	+15 37	53.0	E
	10	C		28.40		52.0	W

LL, 4380. Comparison star to 33.

1884							
Sept.	28	C	2 16	9.99	+16 20	24.5	E
Oct.	5	C		10.03		25.0	W

30. [LAC. κ *Fornacis*].

1884							
Sept.	12	C	2 17	14.02	—24 20	38.6	W
	17	C		14.06		38.3	W
	19	C		14.10		36.6	W
	20	C		14.10		39.1	E
	24	C		14.00		40.1	E
1885							
Oct.	22	H		16.88		21.6	E

31. 72 ρ *Ceti*.

1884.							
Sept.	12	C	2 20	20.77	—12 48	51.6	W
	17	C		20.80		52.3	W
	19	C		20.78		51.8	W
	20	C		20.76		51.7	E
	24	C		20.65		52.0	E
Oct.	2	C		20.81		51.7	E

32. 76 σ Ceti.

1884.									
Sept.	12	C	2	26	35.35	—15	45	16.5	W
	17	C			35.38			17.8	W
	19	C			35.49			16.4	W
	20	C			35.41			16.4	E
	21	C			35.26			17.1	E
	28	C			35.41			17.3	E

36 H. Cassiopeiae,* U. C.

1884.									
Oct.	5	C	2	27	1.62	+72	18	34.4	W
Nov.	15	H			1.49			35.2	E

36 H. Cassiopeiae,* S. P.

1885.									
May	21	H	2.	27	7.22	+72	18	50.5	E
	23	H			6.97			53.5	E
June	1	C			7.09			48.3	E

33. 81 Ceti.

1884.									
Sept.	12	C	2	31	51.22	—3	53	56.0	W
	17	C			51.20			58.1	W
	19	C			51.22			56.3	W
	20	C			51.21			56.9	E
	24	C			51.26			57.5	E
Nov.	15	H			51.19			56.2	E

34. 82 δ Ceti.*

1884.									
Sept.	12	C	2	33	32.30	—0	10	21.4	W
	17	C			32.22			21.8	W
	19	C			32.25			21.6	W
	20	O			32.19			21.2	E
	24	C			32.22			...	E
	28	C			32.28			21.0	E
Oct.	2	C			32.18			21.9	E
	10	C			32.15			21.7	W

6 Persei.*

1884.									
Sept.	28	C	2	36	16.80	+48	44	12.5	E
Oct.	2	C			.....			12.7	E
	10	C			.....			12.6	W
Dec.	9	H			.....			12.8	E

W. B.; 2^h; 864. Comparison Star to 33.

1884.							
Nov.	6	H	2 37	11.20	+17 3	14.6	W
	7	H		.....		15.2	W
	20	H		11.30		13.8	E
	30	H		11.19		15.3	E
Dec.	2	H		.....		16.7	E

35. 89 π Ceti.*

1884.							
Sept.	12	C	2 38	36.10	-14 21	2.7	W
	17	C		36.16		2.9	W
	19	C		36.14		1.9	W
	20	C		36.14		2.9	E
	24	C		36.12		2.0	E
Nov.	15	H		36.14		1.1	E

 β Fornacis.

1884.							
Sept.	28	C	2 44	....	-32 53	38.4	E
Oct.	2	C		....		38.8	E
	5	C		....		36.3	W
	10	C		....		39.2	W
Nov.	7	H		....		37.7	W
	30	H		....		38.1	E
Dec.	2	H		....		37.4	E
	9	H		....		37.7	E

36. 2 τ^2 Eridani.*

1884.							
Sept.	12	C	2 45	46.61	-21 28	58.6	W
	17	C		46.60		59.2	W
	19	C		46.67		58.7	W
	20	C		46.60		58.5	E
	24	C		46.62		58.0	E
Nov.	15	H		46.63		57.6	E

 τ Persei.*

1884.							
Oct.	10	C	2 46	2.31	+52 17	10.9	W
Nov.	30	H		2.17		...	E
Dec.	2	H		2.17		12.8	E
	9	H		....		12.9	E

47 H. Cephei,* U. C.

1884.							
Sept.	12	C	2 50	42.83	+73 57	30.0	W
	19	C		42.90		29.5	W
	20	C		42.58		29.9	E
Oct.	2	C		42.76		30.7	E

47 H. *Cephei*,* S. P.

1884.								
May 10	H	2	50	42.95	+78	57	31.5	E
June 7	C			42.99			29.9	W
1885.								
May 25	H			50.48			45.4	W

37. 3 η *Eridani*.*

1884.								
Sept. 25	C	2	50	45.67	—9	21	37.4	E
28	C			45.50			37.1	E
Oct. 5	C			45.66			37.8	W
10	C			45.62			38.1	W
Nov. 15	H			45.62			37.9	E

38. 92 α *Ceti*.*

1884.								
Sept. 19	C	2	56	12.97	+3	38	3.0	W
20	C			12.98			1.7	E
24	C			12.96			1.7	E
Oct. 5	C			12.90			2.0	W
Nov. 7	H			12.83			2.0	W
18	H			12.95			3.3	E

39. τ^3 *Eridani*.

1884								
Sept. 24	C	2	57	16.71	—24	4	....	E
28	C			16.60			47.7	E
Oct. 2	C			16.73			48.9	E
10	C			16.58			48.7	W
Nov. 6	H			16.50			48.2	W
15	H			16.68			48.1	E

48 H. *Cephei*.*

1884								
Sept. 24	C	3	5	38.43	+77	18	23.3	E
Nov. 6	H			38.50			....	W
7	H			38.28			....	W
11	H			38.44			23.2	W
13	H			38.40			23.2	W

40. 94 *Ceti*.

1884								
Sept. 28	C	3	6	51.23	—1	37	51.7	E
Oct. 2	C			51.25			51.6	E
5	C			51.24			51.8	W
10	C			51.25			51.0	W
Nov. 6	H			51.24			51.0	W
15	H			51.22			50.9	E

α Fornacis (12 Eridani)*

1884									
Nov.	7	H	3	7	8.55	—29	26	42.6	W
	20	H			8.63			43.4	E
	30	H			8.56			42.1	E
Dec.	2	H			8.70			43.9	E
	9	H			8.71			40.8	E

41. 13 ζ Eridani.

1884									
Sept.	24	C	3	10	11.85	—9	15	4.6	E
	28	C			11.87			5.5	E
Oct.	5	C			11.96			6.0	W
	19	C			11.91			5.8	W
Nov.	6	H			11.87			5.1	W
	15	H			11.95			4.8	E

42. 16 τ^4 Eridani.

1884.									
Sept.	24	C	3	14	21.39	—22	10	50.5	E
Oct.	2	C			21.41			50.7	E
	5	C			21.43			50.6	W
	10	C			21.39			51.4	W
Nov.	6	H			21.26			51.3	W
	15	H			21.48			50.6	E

 α Persei*.

1884.									
Sept.	28	C	3	16	2.75	+49	26	49.6	E
Oct.	10	C			2.74			49.7	W
Nov.	6	H			....			49.6	W
	7	H			2.66			50.1	W
	11	H			....			50.3	W
	13	H			2.63			49.0	W
	18	H			2.76			....	E
	20	H			2.62			49.5	E
	30	H			2.64			50.4	E
Dec.	2	H			2.61			50.9	E
	3	H			2.56			49.7	E
	31	H			2.64			49.8	W
1885.									
Jan.	2	H			6.97		27	2.9	W
	8	C			6.95			....	W
	9	C			6.89			....	W

2 H. *Camelopardalis* *, S. P.

1885.								
May 23	H	8	19	45.57	+59	32	18.4	E
25	H			46.12			18.9	W
June 1	C			.....			18.0	E

43. LL 6476.

1884.								
Sept. 24	C	8	24	7.15	-18	4	30.2	E
28	C			7.09			31.9	E
Oct. 5	C			7.31			31.6	W
Nov. 6	H			7.21			31.3	W
11	H			7.24			30.8	W
18	H			7.11			33.2	E

44. 17 *Eridani*.

1884.								
Oct. 2	C	8	24	51.74	-5	28	26.4	E
10	C			51.69			25.2	W
Nov. 7	H			51.71			25.0	W
18	H			51.73			26.5	W
15	H			51.68			25.5	E
20	H			51.81			25.5	E

45. 18 ϵ *Eridani*.*

1884.								
Oct. 2	C	8	27	27.92	-9	51	7.2	E
5	C			27.89			6.6	W
Nov. 6	H			27.86			6.2	W
7	H			27.91			6.7	W
11	H			27.89			6.7	W
13	H			28.05			4.8	W
18	H			28.03			7.3	E
20	H			27.97			6.4	E
30	H			28.00			6.6	E
Dec. 2	H			28.03			6.6	E
3	H			27.96			6.9	E
9	H			27.98			6.3	E
31	H			27.99			6.8	W
1885.								
Jan. 2	H			30.77		50	54.3	W
8	C			30.72			....	W
9	C			30.71			....	W

46. 20 *Eridani*.

1884.								
Oct. 2	C	8	31	0.31	-17	51	7.3	E
5	C			0.26			8.1	W
Nov. 6	H			0.26			8.3	W
7	H			0.16			7.2	W
15	H			0.33			7.0	E
18	H			0.33			7.6	E

*δ Perset.**

1884.							
Nov.	6	H	3 34	40.17	+47 24	55.0	W
	7	H		40.16		54.3	W
	13	H		40.28		....	W
	18	H		40.15		54.7	E
	20	H		40.08		54.8	E
	30	H		40.22		54.9	E
Dec.	2	H		40.12		55.9	E
	3	H		....		53.0	E
	8	H		40.09		55.3	E
	9	H		40.10		55.3	E
	26	H		....		55.8	W
	31	H		40.05		55.3	W
1885.							
Jan.	2	H		44.36	25	7.6	W
	8	C		44.33		...	W
	9	C		44.36		...	W

*47. 23 δ Eridani.**

1884.						
Oct. 5	C	3 37	41.47	-10 9	25.4	W
10	C		41.45		25.1	W
Nov. 6	H		41.52		25.3	W
18	H		41.46		25.0	E
30	H		41.53		24.5	E

*AUWERS 1 = 17 Tauri.**

1884.						
Dec. 2	H	3 37	59.28	+23 44	50.4	E
3	H		59.25		....	E
8	H		59.35		50.8	E
9	H		59.14		50.1	E
26	H		....		51.8	W
31	H		59.30		50.2	W
1885.						
Jan. 2	H		59.19		49.8	W
8	C		59.28		....	W
9	C		59.43		....	W

5 H. Camelopardalis, U. C.**5 H. Camelopardalis,* S. P.*

1884.						
May 15	H	3 38	7.47	+70 58	27.0	E
19	H		7.53		23.3	E
June 5	C		7.53		25.1	W
9	C		7.90		24.6	W

48. 24 Eridani.

1884.							
Nov.	7	H	3 38	36.92	-1 31	47.9	W
	11	H		36.92		47.4	W
	13	H		37.11		48.4	W
	15	H		37.03		47.9	E
	20	H		36.95		47.4	E

AUWERS 2= η . Tauri.*

1884.							
Dec.	2	H	3 40	35.52	+23 44	42.3	E
	3	H		35.35		42.4	E
	8	H		35.44		43.0	E
	9	H		35.36		43.1	E
	26	H		...		43.4	W
	31	H		35.40		43.6	W
1885.							
Jan.	2	H		35.38		43.6	W
	8	C		35.41		....	W
	9	C		35.43		...	W

49. 27 τ^{ϵ} Eridani.*

1884.							
Nov.	6	H	3 41	51.42	-23 35	36.5	W
	7	H		51.53		36.0	W
	11	H		51.46		35.8	W
	15	H		51.46		36.3	E
	18	H		51.42		35.3	E
	20	H		51.51		36.0	E

AUWERS 3 = 27 Tauri.*

1884							
Dec.	2	H	3 42	15.92	+23 41	50.4	E
	3	H		15.86		51.6	E
	8	H		15.99		51.1	E
	9	H		16.06		50.3	E
	26	H		.....		50.3	W
	31	H		15.93		51.9	W
1885							
Jan.	2	H		15.84		51.8	W
	8	C		15.94		....	W
	9	C		15.92		...	W

 ζ Persei *.

1884							
Dec.	2	H	3 46	50.41	+31 32	16.7	E
	3	H		50.52		16.8	E
	8	H		50.51		16.5	E
	9	H		50.51		16.4	E
	26	H		.....		16.9	W
	31	H		50.33		16.6	W
1885							
Jan.	2	H		54.22		27.9	W
	8	C		54.27		....	W
	9	C		54.30		....	W

50. 30 *Eridani*.

1884								
Nov.	6	H	3 46	57.85	— 5 42	31.4		W
	7	H		57.88		30.3		W
	11	H		57.79		29.4		W
	15	H		57.88		31.2		E
	18	H		57.77		31.1		E
	20	H		57.94		32.3		E

9 H. *Camelopardalis* *, U. C.9 H. *Camelopardalis* *, S. P.

1885								
May	23	H	3 47	20.03	+60 46	14.5		E
	25	H		20.31		13.6		W
June	1	C		.....		13.6		E

 ϵ *Persei* *

1884								
Dec.	3	H	3 50	4.28	+39 40	24.2		E
	8	H		4.19		24.1		E
	9	H		4.23		24.1		E
	26	H		....		24.3		W
	31	H		4.38		24.2		W
1885								
Jan.	2	H		8.24		34.7		W
	8	C		8.27		....		W
	9	C		8.40		....		W

51. 34 γ *Eridani* *

1884								
Nov.	6	H	3 52	37.03	—13 50	23.0		W
	7	H		37.01		21.0		W
	11	H		36.92		20.8		W
	15	H		37.00		22.2		E
	18	H		37.03		21.5		E
	20	H		37.06		21.8		E
Dec.	3	H		37.11		22.2		E
	8	H		37.09		21.5		E
	9	H		36.98		20.9		E
	26	H		....		22.7		W
	31	H		37.09		21.9		W
1885								
Jan.	2	H		39.80		11.6		W
	9	C		39.80		....		W

52. 38 ν Tauri.*

1884.						
Nov. 6	H	3 56	59.12	+5 39	60.2	W
7	H		59.12		60.1	W
11	H		59.16		59.9	W
13	H		59.15		59.0	W
15	H		59.15		58.9	E
18	H		59.15		58.9	E
20	H		59.13		59.3	E
Dec. 2	H		59.21		58.8	E
3	H		59.14		59.1	E
8	H		59.22		59.1	E
9	H		59.15		59.7	E
26	H		.....		59.8	W
31	H		59.23		59.0	W
1885.						
Jan. 2	H	57	2.41	40	10.3	W
8	C		2.35		...	W
9	C		2.23		....	W

GR. 750.*

1884.						
Nov. 6	H	4 0	30.85	+85 14	51.3	W
15	H		31.27		....	E
18	H		30.87		....	E
20	H		31.18		....	E
30	H		30.84		48.9	E
Dec. 2	H		30.99		50.4	E
3	H		30.69		51.6	E
8	H		31.03		51.1	E
9	H		30.72		49.2	E
26	H		....		50.6	W
31	H		30.44		51.1	W
1885						
Jan. 3	H		....		15.07	W
8	C		47.68		....	W
9	C		47.82		....	W

53. LL. 7685.

1884						
Nov. 7	H	4 1	24.93	-18 21	49.0	W
11	H		25.02		48.7	W
13	H		24.92		49.8	W
15	H		25.01		49.0	E
18	H		24.92		49.6	E
29	H		24.96		49.0	E

 μ Persei.

1884						
Nov. 13	H	4 6	....	+48 6	46.2	W
30	H		....		46.2	E
Dec. 2	H		....		47.9	E
3	H		....		47.2	E
8	H		....		47.7	E

54. 38 o' *Eridani*.*

1884.									
Nov. 6	H	4	6	12.18	—7	8	28.5	W	
7	H			12.15			27.0	W	
11	H			12.25			28.2	W	
15	H			12.16			28.4	E	
18	H			12.19			28.3	E	
20	H			12.25			28.1	E	

RUMKER 1119=Comp. star to 33.

1884.									
Nov. 13	H	4	7	35.39	+23	16	50.5	W	

55. 39 A *Eridani*.

1884.									
Nov. 6	H	4	8	52.57	—10	32	43.3	W	
7	H			52.59			43.0	W	
11	H			52.58			44.2	W	
15	H			52.65			43.4	E	
18	H			52.50			42.8	E	
20	H			52.58			43.7	E	

X *Eridani*.

1884.									
Nov. 6	H	4	13	.....	—34	4	56.3	W	
11	H			.....			56.7	W	
13	H			.....			56.7	W	
18	H			.....			57.2	E	
20	H			.....			56.0	E	
30	H			.....			56.7	E	
Dec. 2	H			.....			56.0	E	

56. LL 8205.

1884.									
Nov. 6	H	4	15	35.47	—20	55	3.3	W	
7	H			35.44			2.4	W	
11	H			35.23			2.3	W	
15	H			35.43			2.0	E	
18	H			35.43			1.5	E	
20	H			35.37			0.7	E	

57. 42 ξ *Eridani*.

1884									
Nov. 6	H	4	17	54.30	—4	0	53.8	W	
7	H			54.30			52.7	W	
11	H			54.45			53.9	W	
15	H			54.30			53.1	E	
18	H			54.12			53.7	E	
20	H			54.22			53.6	E	

ε Tauri.*

1884									
Nov.	7	H	4	21	50.66	+18	55	18.4	W
	11	H			50.62			18.4	W

58. 45 Eridani.

1884									
Nov.	6	H	4	25	56.56	—0	17	38.2	W
	7	H			56.63			38.3	W
	11	H			56.67			39.3	W
	15	H			56.66			38.2	E
	18	H			56.58			38.1	E
	20	H			56.69			38.0	E

 ν^1 Eridani.

1884									
Nov.	6	H	4	28	.....	—30	0	6.3	W
	7	H			.....			7.4	W
	13	H			.....			6.2	W
	18	H			.....			6.8	E
	20	H			.....			6.7	E
	30	H			.....			7.1	E
Dec.	2	H			.....			7.4	E

59. 48 ν Eridani.*

1884									
Nov.	6	H	4	30	31.42	—3	35	26.6	W
	7	H			31.35			26.1	W
	11	H			31.51			27.4	W
	15	H			31.40			26.6	E
	18	H			31.24			26.8	E
	20	H			31.43			26.7	E
	30	H			31.29			26.2	E

60. 53 Eridani.*

1884									
Nov.	6	H	4	32	52.04	—14	31	54.5	W
	7	H			52.07			54.3	W
	11	H			52.07			54.9	W
	15	H			52.10			54.2	E
	18	H			52.02			54.3	E
	20	H			52.07			53.2	E

GR. 848.*

1884									
Nov.	13	H	4	83	14.56	+75	43	36.8	W

61. 54 *Eridani*.

1884.									
Nov.	6	H	4	35	21.93	—19	53	42.4	W
	9	H			22.02			43.5	W
	11	H			22.08			42.9	W
	15	H			22.05			42.0	E
	18	H			21.96			42.4	E
	20	H			22.07			42.3	E

62. 57 μ *Eridani* *.

1884.									
Nov.	6	H	4	39	42.19	-3	28	5.5	W
	7	H			42.15			6.8	W
	11	H			42.15			8.0	W
	15	H			42.16			6.3	E
	18	H			42.16			6.8	E
	20	H			42.11			6.3	E

9 *Camelopardalis* *.

1884.									
Nov.	6	H	4	42	31.46	+66	8	37.2	W

64. 60 *Eridani*.

1884.									
Nov.	7	H	4	44	57.92	-16	25	11.5	W
	11	H			57.90			13.3	W
	15	H			57.91			11.8	E
	30	H			.....			10.4	E
Dec.	2	H			57.99			12.1	E

63. π^4 *Orionis* *.

1884.									
Nov.	6	H	4	45	1.66	+5	24	18.9	W
	13	H			1.68			20.4	W
	18	H			1.63			20.2	E
	20	H			1.71			20.3	E

65. 78 π^5 *Orionis* *.

1884.									
Nov.	6	H	4	48	12.51	+2	14	58.9	W
	7	H			12.61			59.2	W
	11	H			12.54			57.9	W
	13	H			12.44			58.8	W
	15	H			12.54			58.3	E
	18	H			12.44			57.7	E
	20	H			12.58			58.2	E

10 *Camelopardalis*,* U. C.10 *Camelopardalis*,* S. P.

1885.									
June 1	C	4	53	.....	+60	16	20.3	E	

66. 64 *Eridani*.

1884.									
Nov. 6	H	4	54	32.88	-12	43	33.8	W	
7	H			32.85			33.4	W	
11	H			32.28			35.1	W	
13	H			32.80			33.2	W	
15	H			32.39			34.2	E	
18	H			32.41			33.9	E	
20	H			.....			34.1	E	

LL. 9542; (B. A. C. 1559).

1884.									
Nov. 11	H	4	57	.....	-26	26	25.1	W	
13	H			.....			25.7	W	
15	H			.....			26.6	E	
18	H			.....			25.7	E	
20	H			.....			26.0	E	
Dec. 2	H			.....			27.8	E	

67. 2 ε *Leporis*.*

1884.									
Nov. 6	H	5	0	33.10	-22	31	40.7	W	
7	H			32.93			40.4	W	
11	H			33.13			40.2	W	
15	H			33.02			40.0	E	
18	H			33.11			40.0	E	
20	H			32.98			40.2	E	

68. 67 β *Eridani*.*

1884.									
Nov. 1	H	5	2	8.88	-5	14	15.1	W	
13	H			8.80			14.3	W	
15	H			8.82			15.5	E	
27	H			[8.58]			14.4	E	
Dec. 2	H			8.91			16.6	E	

Nov. 27 is rejected as the Right Ascensions from groups O and P of the reticle differ 0s.3.

19 H. *Camelopardalis*,* U. C.

1884									
Nov. 15	H	5	3	27.46	+79	5	.....	E	
18	H			27.46			.....	E	
27	H			27.61			...	E	

19 *H. Camelopardalis*,* S. P.

1884.								
May 2	H	5	3	27.63	+79	5	....	E
June 10	C			28.09			....	W
11	C			28.09			....	W
1885.								
May 30	C			37.38			44.0	W
June 13	C			37.63			46.4	E

69. 69 λ *Eridani*,*

1884.								
Nov. 6	H	5	3	35.66	-8	54	13.3	W
11	H			35.82			13.0	W
18	H			35.74			14.2	E
20	H			35.67			13.8	E
Dec. 2	H			35.82			14.8	E

 α *Aurigae*,*

1884.								
Nov. 13	H	5	8	7.23	+45	52	42.0	W
Dec. 2	H			7.21			42.1	E

70. 19 β *Orionis*,*

1884.								
Nov. 6	H	5	8	57.74	-8	20	12.5	W
7	H			57.77			12.0	W
11	H			57.77			10.4	W
15	H			57.74			12.8	E
18	H			57.69			12.0	E
20	H			57.68			12.7	E
27	H			57.63			11.0	E

71. 20 τ *Orionis*,*

1884.								
Nov. 7	H	5	11	58.37	-6	58	15.1	W
11	H			58.35			14.6	W
13	H			58.38			15.8	W
18	H			58.43			14.7	E
20	H			58.57			15.3	E
27	H			58.41			13.3	E

72. 28 η *Orionis med.*,*

1884								
Nov. 7	H	5	18	38.70	-2	30	18.0	W
11	H			38.61			18.7	W
13	H			38.67			17.7	W
18	H			38.64			17.9	E
20	H			38.68			18.2	E
27	H			38.86			19.4	E

17 *Camelopardalis*,* U. C.17 *Camelopardalis*,* S. P.

1885									
May	30	C	5	19	18.71	+62	58	8.6	W
June	10	U			.....			8.9	E
	13	C			.....			9.9	E
	18	U			.....			8.1	E
	21	C			.....			9.2	E
	25	C			.....			7.2	W
	29	C			.....			9.7	W
July	3	U			.....			7.7	W
	9	U			.....			9.9	W

73. 9 β *Leporis*.*

1884									
Nov.	7	H	5	23	16.52	—20	51	11.1	W
	13	H			16.51			9.5	W
	18	H			16.59			9.7	E
	27	H			16.53			10.9	E

Gr. 966,* U. C.

1884									
Nov.	6	H	5	24	13.29	+74	57	50.4	W
	11	H			13.08			....	W
	20	H			12.89			....	E

Gr. 966,* S. P.

1884.									
July	9	C	5	24	13.14	+74	57	52.0	E
	10	C			13.16			51.4	E
1885.									
June	10	U			.....			54.2	E
	13	C			21.12			54.2	E
	18	U			.....			54.4	E
July	3	U			.....			54.1	W
	9	U			.....			54.2	W
Aug.	17	H			21.05			....	E

74. 11 α *Leporis*.*

1884.									
Nov.	7	H	5	27	36.87	-17	54	23.4	W
	11	H			36.78			22.5	W
	13	H			36.79			22.6	W
	18	H			.....			23.1	E
	20	H			36.83			22.4	E
	27	H			36.79			22.8	E

75. 44 *Orionis*.*

1884.							
Nov.	7	H	5	29	45.49	—5 59 12.9	W
	11	H			45.52		W
	13	H			45.58	13.0	W
	18	H			....	13.0	E
	27	H			45.58	14.8	E

76. 46 ϵ Orionis *

α Columbae.

1884.									
Nov.	7	H	5	35	26.90	—34	8	12.2	W
	11	H			.....			12.9	W
	13	H			.....			12.9	W
	18	H			.....			11.1	E
	27	H			.....			10.4	E

77. 13 γ Leporis.*

1884.								
Nov. 7	H	5	39	37.62	—22	29	14.1	W
11	H			37.55			12.8	W
13	H			37.63			14.1	W
18	H			37.68			18.8	E
27	H			37.64			14.8	E

78. 14 ζ *Leporis*.*

79. 53 *k* Orionis.*

1894.						
Nov. 11	H	5 42	15.20	-9 42	42.5	W
18	H		15.35		42.9	W
18	H		.....		42.5	E
27	H		15.26		42.5	E

80. 15 δ *Leporis*.*

1884,							
Nov. 7	H	5	46	20.00	-20	53	24.2
11	H			19.95			23.8
18	H			19.94			22.8
27	H			19.94			24.9
							W
							W
							W
							E

*β Aurigae.**

1885.
Feb. 20 H 5 51 5.65 +44 56 4.0 W
Feb. 20; poor obs. temp. 0° Fahr.

81. 16 η Leporis.*

1884								
Nov. 7	H	5	51	7.28	-14	11	24.0	W
11	H			7.31			24.4	W
13	H			7.35			24.2	W
27	H			7.32			24.4	E

82. LL. 11332.

1884								
Nov. 7	H	5	54	15.23	-5	4	48.1	W
11	H			15.23			49.5	W
13	H			15.15			48.2	W
27	H			15.29			48.7	E

83. 66 Orionis*.

1884								
Nov. 7	H	5	58	50.67	+4	9	50.4	W
11	H			50.70			48.9	W
13	H			50.51			51.6	W
27	H			50.83			49.8	E
1885								
Feb. 26	H			53.88			....	E

 ν Orionis*.

1885								
Feb. 20	H	6	1	0.36	+14	46	51.3	W

22 H. Camelopardalis*.

1884								
Nov. 11	H	6	6	3.68	+69	21	30.2	W
1885								
Feb. 26	H			10.31			29.1	E

84. 5 Monocerotis.

1884								
Nov. 27	H	6	9	11.89	-6	14	24.1	E
1885								
Feb. 20	H			14.88			25.2	W
26	H			14.86			27.0	E

85. 6 Monocerotis.

1885.								
Feb. 20	H	6	12	10.81	-10	41	4.3	W

♂ *Canis Majoris*.

1884.								
Nov. 27	H	6	15	.....	-30	0	45.8	E
1885.								
Feb. 20	H			.....			46.5	W
26	H			.....			46.7	E

86. 2β *Canis Majoris**.

1884.								
Nov. 27	H	6	17	35.48	-17	53	56.4	E
1885.								
Feb. 20	H			38.15			58.1	W
26	H			38.19			59.4	E

87. 10 *Monocerotis**.

1884.								
Nov. 27	H	6	22	13.86	-4	41	28.9	E
1885.								
Feb. 20	H			16.83			31.3	W
26	H			16.85			31.8	E

23 H. *Camelopardalis*,* U. C.

1885.								
Feb. 26	H	6	26	34.94	+79	41	7.0	E

23 H. *Camelopardalis*,* S. P.

1884.								
June 9	C	6	26	25.20	+79	41	11.5	W
July 9	C			25.20			....	E

8 *Lyncis*,* U. C.8 *Lyncis*,* S. P.

1885.								
May 30	C	6	27	10.69	+61	34	48.1	W
June 10	U			....			49.4	E
21	C			....			49.5	E
25	C			....			48.5	W
29	C			....			48.4	W
July 3	U			....			47.9	W
13	U			...			49.6	W

88. 5 $\frac{1}{2}$ *Canis Majoris*.*

1884. Nov. 27	H	6 30	11.66	-22 52	25.2	E
1885. Feb. 20	H		14.07		28.5	W
26	H		14.24		28.6	E

89. P., VI^h 203.

1884. Nov. 27	H	6 35	7.69	+0 36	7.5	E
1884. Feb. 20	H		10.75		4.5	W
26	H		10.66		5.2	E

90. 9 α *Canis Majoris*.*

1884. Nov. 27	H	6 40	2.32	-16 33	28.7	E
1885. Feb. 20	H		4.87		34.0	W
26	H		4.90		32.7	E

91. 18 *Monocerotis*.*

1885. Feb. 20	H	6 41	51.92	+2 32	12.8	W
26	H		51.90		13.1	E

 κ *Canis Majoris*.51 H. *Cephei**, U. C.

1884. Nov. 27	H	6 45	46.26	+87 13	29.7	E
1885. Feb. 20	H	46	15.74	....		W

51 H. *Cephei**, S. P.

1885. Aug. 16	H	6 46	16.97		E
------------------	---	------	-------	------	--	---

15 *Lyncis**, U. C.

15 *Lyncis**, S. P.

1885.								
May 30	C	6	47	.....	+58	34	16.5	W
June 13	C			.....			21.8	E
21	C			.....			19.6	E
25	C			.....			15.9	W
29	C			.....			18.9	W

92. 14 δ *Canis Majoris*.*

1885.								
Feb. 26	H	6	48	50.78	-11	58	43.7	E

93. 19 *Canis Majoris*

Feb. 26	H	6	50	38.24	-19	59	25.4	E
---------	---	---	----	-------	-----	----	------	---

94. P., *Vlh* 303.

1885.								
Feb. 20	H	6	53	53.10	-25	15	32.6	W
26	H			53.13			31.1	E

 ϵ *Canis Majoris*.*95. 19 *Monocerotis*.

1885.								
Feb. 20	H	6	57	12.22	-4	4	26.0	W
26	H			12.13			24.5	E

96. 23 γ *Canis Majoris* *97. 20 *Monocerotis*.

1885.								
Feb. 20	H	7	4	30.92	-4	3	32.8	W
26	H			30.99			30.8	E

 λ *Geminorum*.*

1885.								
Feb. 26	H	7	11	28.99	+16	44	48.5	E

98. 29 *Canis Majoris*.

1885									
Feb.	20	H	7 13	52.97	-24	21	0.2	W	

99. P., VII^b 85.

1885									
Feb.	20	H	7 16	31.13	-8	45	46.7	W	
	26	H		31.13			46.1	E	

21 *Lyncis*.100. P., VII^b 116.

1885									
Feb.	20	H	7 22	27.23	-11	19	28.5	W	
	26	H		27.33			27.7	E	

101. Ll. 14810.

1885									
Feb.	20	H	7 29	7.77	-22	2	55.5	W	
	26	H		7.76			53.6	W	

102. 25 *Monocerotis*.*

1885									
Feb.	20	H	7 32	33.59	-3	51	18.9	W	
	26	H		33.54			18.6	E	

f *Puppis*.103. 10 α *Canis Minoris*.*

1885									
Feb.	20	H	7 33	16.93	+5	31	8.1	W	
	26	H		16.87			7.9	E	
Mar.	21	H		16.97			8.3	W	

104. 26 *Monocerotis*.

1885									
Feb.	20	H	7 35	45.14	-9	17	3.6	W	
	26	H		45.16			1.8	E	
Mar.	21	H		45.22			1.1	W	

1 *Puppis* (τ *Navis*.)

1885.		105.	4	Navis.				
Mar. 21	H	7 40	39.25	-14	17	6.7		W
				GR. 1874,*	U. C.			
				GR. 1874,*	S. P.			
1884								
Sept. 11	C	7 46	17.14	+74	13	28.0		W
1885								
Aug. 30	H		24.59			....		E

106. 9 *Navis med.*

1885							
Feb. 26	H	7 46	26.77	-13	35	37.2	E

107. 11 e *Navis*.

1885.							
Feb. 26	H	7 51	54.89	-22	34	26.5	E
Mar. 21	H		54.84			26.2	W

108. 27 *Monocerotis*,

1885.							
Feb. 26	H	7 53	59.37	-3	22	2.2	E
Mar. 21	H		59.48			1.3	W

27 *Lyncis*.*

1885.							
Feb. 26	H	7 59	48.14	+51	50	13.1	E
Mar. 7	C		[48.25]			[12.2]	E
8	C		48.06			13.2	E
9	C		48.14			13.0	E
10	C		48.28			13.0	E
11	C		48.14			13.4	E
16	C		....			12.5	W
19	C		48.25			13.7	W
20	C		48.26			12.8	W
21	H		48.30			12.8	W
22	C		48.25			13.6	W
24	C		48.49			12.8	E

109. 15 ι Navis.*

1885.								
Feb. 26	H	8	2	38.78	-23	58	24.7	E
Mar. 21	H			38.76			25.8	W

BR. 1147.*

1885.								
Feb. 26	H	8	5	3.85	+76	6	....	E
Mar. 7	C			[3.88]			[22.0]	E
8	C			3.96			20.8	E
9	C			4.03			21.6	E
10	C			4.03			21.8	E
11	C			4.08			22.2	E
16	C			4.05			21.4	W
19	C			3.94			21.2	W
20	C			3.89			21.3	W
21	H			4.06			20.4	W
22	C			3.96			20.6	W
24	C			3.97			21.4	E
28	H			3.90			20.8	E
Apr. 4	H			4.11			....	E

110. 20 Navis.*

1885.								
Feb. 26	H	8	8	2.83	-15	26	33.0	E
Mar. 7	C			[2.35]			[33.8]	E
8	C			2.89			....	E
9	C			2.85			32.0	E
10	C			2.85			33.9	E
11	C			2.85			32.5	E
16	C			3.87			33.0	W
19	C			2.76			33.2	W
20	C			2.86			32.3	W
21	H			2.75			33.6	W
22	C			2.79			33.0	W
24	C			2.80			32.8	E
28	H			2.88			33.7	E
April 4	H			2.77			....	E

 β Cancri.*

1885.								
Mar. 7	C	8	10	[16.66]	+9	32	[19.5]	E
8	C			16.64			20.7	E
9	C			16.71			20.4	E
10	C			16.72			20.3	E
11	C			16.74			20.2	E
16	C			16.75			20.6	W
19	C			16.64			20.5	W
20	C			16.66			19.7	W
22	C			16.62			20.5	W
24	C			17.71			20.7	E
28	H			16.65			22.0	E
April 4	H			16.68			20.1	E

111. LL. 16304.

1885							
Feb. 26	H	8 12	56.39	—12 14	36.8	E	
Mar. 21	H		56.45		36.1	W	
28	H		56.51		35.9	E	
April 4	H		56.47		36.0	E	

W₂ B.; 8^h, 284.

1885.						
Mar. 7	C	8 14	[43.25]	+22 16	[23.5]	E
9	C		43.34		22.6	E
10	C		43.37		24.3	E
24	C		43.38		23.7	W

31 *Lyncis*.*

1885.						
Feb. 26	H	8 14	57.43	+43 33	....	E
Mar. 28	H		57.55		22.2	E
April 4	H		57.53		....	E

W₂ B.; 8^h, 341.

1885.						
Mar. 8	C	8 16	53.05	+22 11	20.8	E
9	C		53.08		19.7	E
16	C		.....		19.7	W
20	C		53.08		20.6	W

W₂ B.; 8^h, 358.

1885.						
Mar. 24	C	8 17	49.55		.....	E

AUWERS 9.

1885.						
Mar. 7	C	8 19	[37.21]	+2 28	[33.4]	E
8	C		37.27		33.2	E
9	C		37.33		33.1	E
10	C		37.37		33.7	E
11	C		37.30		32.4	E
16	C		37.29		32.0	W
19	C		37.37		33.3	W
20	C		37.27		34.1	W
22	C		37.36		33.1	W
24	C		37.34		31.9	E

112. BRADLEY 1197.*

1885.						
Feb. 26	H	8 19	54.78	—3 31	56.4	E
Mar. 21	H		54.83		54.9	W
28	H		54.95		55.7	E
April 3	H		54.94		55.0	E
4	H		54.88		55.6	E

o *Ursae Majoris*,* U. G.

1885. April 5.	H	8	20	42.32	W
-------------------	---	---	----	-------	------	---

o *Ursae Majoris*,* S. P.

1885. May 30	C	8	20	42.26	+61 6	5.5	W
June 18	C			42.17		5.7	E
18	U			....		5.0	E
21	C			42.08		4.5	E
25	C			42.18		3.8	W
29	C			42.20		5.4	W
July 14	U			42.13		4.8	W
15	U			42.14		5.3	W
Aug. 10	H			42.06		5.1	E
13	H			42.11		5.3	E
14	H			42.16		6.3	E
15	H			42.15		2.9	E
21	H			42.13		...	E
25	H			42.18		...	E

AUWERS 11.

1885. Mar. 7	C	8	21	....	+1 12	[17.2]	E
8	C			35.16		18.1	E
9	C			35.16		17.6	E
16	C			34.93		17.6	W
19	C			35.18		18.4	W

AUWERS 12.

1885. Mar. 10	C	8	22	20.39	+0 37	27.3	E
11	C			20.29		25.8	E
20	C			20.30		26.5	W
22	C			20.39		27.4	W
24	C			20.28		26.6	E

AUWERS 14.

1885. Mar. 8	C	8	23	38.88	-0 34	39.6	E
9	C			38.86		38.8	E
10	C			38.91		...	E
11	C			38.83		39.3	E
16	C			38.88		39.6	W
19	C			38.84		38.7	W
20	C			38.82		39.1	W
22	C			38.85		39.7	W
24	C			38.88		39.4	E

*η Cancri.**

1885.								
Mar. 7	C	8 26	....	+20 49	[53.0]		E	
8	C		3.50		51.9		E	
9	C		3.48		51.5		E	
10	C		3.45		51.7		E	
11	C		3.44		51.2		E	
16	C		3.42		51.0		W	
19	C		3.47		51.0		W	
20	C		3.37		51.6		W	
22	C		3.44		51.0		W	
24	C		3.50		50.7		E	

LL 16795.

1885.								
April 5	H	8 26	13.48	-19 7	16.6		W	

113. P., VIII^h, 95.

1885.								
Mar. 21	H	8 26	20.85	-19 11	23.0		W	
28	H		20.88		21.7		E	
April 3	H		20.88		20.2		E	
4	H		20.89		22.0		E	

114. BRADLEY 1212.

1885.								
Mar. 21	H	8 29	51.56	-7 35	13.2		W	
28	H		51.52		13.1		E	
April 4	H		51.45		13.7		E	
5	H		51.43		13.4		W	

115. 6 *Hydrae*.

1885.								
Mar. 21	H	8 34	34.59	-12 4	9.3		W	
28	H		34.57		9.7		E	
April 4	H		34.68		10.9		E	
5	H		34.57		9.8		W	

W₂ B.; 8^h, 875.

1885.								
Mar. 9	C	8 36	14.70	+21 13	48.8		E	
19	C		....		48.7		W	
20	C		[14.48]		...		W	
22	C		14.72		48.6		W	
24	C		14.61		47.9		E	

Mar. 20.—Observer notes that the observation is poor on account of faintness of the star.

W₂ B.; 8h, 889.

1885.							
Mar.	7	C	8 36	[39.29]	+21 0	[42.9]	E
	10	C		39.21		42.8	E
	11	C		39.19		42.8	E

 δ *Canceri*.*

1885.							
Mar.	7	C	8 38	[8.89]	+18 34	[32.6]	E
	8	C		9.08		34.3	E
	9	C		8.92		34.2	E
	10	C		8.90		34.0	E
	11	C		8.88		34.1	E
	16	C		8.95		33.6	W
	19	C		8.91		33.1	W
	20	C		8.81		33.8	W
	21	H		8.93		33.4	W
	22	C		8.91		34.2	W
	24	C		8.95		34.4	E
	28	H		9.05		33.9	E
April	3	H		8.93		34.7	E
	4	H		8.91		34.7	E
	5	H		9.01		33.0	W

 α *Pyxidis*. ι *Canceri*.*

1885.							
Mar.	21	H	8 39	44.16	+29 10	46.4	W
	28	H		44.33		47.2	E
April	3	H		44.18		46.3	E

116. P., VIIh, 167.

1885.							
Mar.	21	H	8 41	25.35	-1 28	33.9	W
	28	H		25.28		34.0	E
April	3	H		25.36		34.8	E
	4	H		25.36		34.6	E
	5	H		25.23		34.9	W
	13	H		25.34		....	W

117. Ll. 17333.

1885.							
Mar.	7	C	8 41	[30.76]	-18 20	[13.7]	E
	9	C		30.98		13.4	E
	10	C		31.01		13.2	E
	11	C		30.98		....	E
	16	C		....		13.6	W
	19	C		30.89		12.6	W
	20	C		30.91		12.3	W
	22	C		30.93		13.2	W
	24	C		30.96		13.2	E

118. 15 *Hydræ*.

1885.							
Mar.	21	H	8 45	55.34	—6 44	48.5	W
	28	H		55.41		48.1	E
April	3	H		55.38		48.8	E
	5	H		55.31		48.4	W
	13	H		55.41		50.3	W

LL 17532

1885.							
Mar.	7	C	8 47	[40.64]	+20 0	[40.6]	E
	9	C		40.68		39.1	E
	10	C		40.66		37.7	E

 ι *Ursæ Majoris*.*

1885.							
Mar.	8	C	8 51	19.83	+48 29	32.4	E

119. P., VIII,^b 227.

1885.							
Mar.	28	H	8 53	20.15	—15 41	40.9	E
April	3	H		20.22		40.7	E
	5	H		20.05		40.2	W

 κ *Ursæ Majoris*.*

1885.							
Mar.	7	C	8 55	[46.23]	+47 36	[39.2]	E
	8	C		46.21		37.7	E
	9	C		46.25		38.3	E
	10	C		46.26		38.1	E
	11	C		46.26		38.1	E
	16	C		46.25		38.2	W
	19	C		46.31		38.5	W
	20	C		46.38		37.4	W
	21	H		46.23		38.2	W
	22	C		46.32		37.9	W
	24	C		46.23		38.0	E
	28	H		46.21		38.0	E
April	3	H		46.16		37.6	E
	4	H		46.15		38.7	E
	5	H		46.26		37.7	W
	13	H		46.29		38.1	W

 σ^s *Ursæ Majoris*,* U. C.

1885.							
Mar.	8	C	9 0	15.92	+67 36	0.5	E
	28	H		15.65		0.2	E
April	3	H		15.59		0.5	E
	4	H		15.53		1.3	E
	13	H		15.74		....	W

σ^2 *Ursae Majoris*,* S. P.

1885.								
May 30	C	9	0	15.71	-67	35	60.4	W
June 13	C			15.78			61.1	E
21	C			15.66			62.3	E
25	C			15.76			59.4	W
29	C			15.65			60.7	W
July 14	U			15.77			....	W
15	U			15.73			60.2	W
Aug. 10	H			15.77			61.5	E
13	H			15.65			63.6	E
14	H			15.67			63.5	E
25	H			15.70			....	E

120. 19 *Hydrae*.

1885.									
Mar. 28	H	9	3	4.47	—	8	7	30.3	E
April 3	H			4.52				29.9	E
4	H			4.51				30.1	E
5	H			4.39				29.8	W
13	H			4.49				30.8	W

121. P., IX^h 13.

1885.								
April 3	H	9	6	42.72	-19	16	40.6	E
4	H			42.82			41.8	E
5	H			42.66			41.3	W
13	H			42.78			42.4	W

W, B.; 9^h, 118.

1885.								
Mar. 11	C	9	8	4.21	+19	7	6.1	E
20	C			4.34			7.2	W
22	C			....			7.2	W
24	C			....			5.2	E

122. 22 θ *Hydrae*^A.

1885.								
Mar. 28	H	9	8	22.80	+2	47	55.6	E
April 3	H			...			55.4	E
4	H			22.90			55.6	E
5	H			22.80			56.2	W
13	H			22.98			55.6	W

W, B.; 9^h, 170.

1885.								
Mar. 7	C	9	10	[27.88]	+18	36	[28.4]	E
9	C			....			30.5	E
10	C			27.87			29.7	E
19	C			27.75			30.8	W

83 *Cancræ*.*

1885.								
Mar.	28	H	9 12	33.78	18 11	32.2	E	
April	3	H		....		32.1	E	
	5	H		33.80		31.6	W	
	13	H		33.75		31.1	W	

123. [*Lac. ♀ Pyxid. naut.*]

1885.								
Mar.	28	H	9 16	24.16	—25 28	34.6	E	
April	3	H		..		34.6	E	
	4	H		24.13		35.8	E	
	5	H		24.12		35.3	W	
	13	H		24.18		36.3	W	

Λ Pyxidæ,1 *H. Draconis*,* U. C.

1885.								
April	3	H	9 20	36.74		....	E	
	4	H		36.37		....	E	
	5	H		36.48		....	W	
	13	H		36.59		....	W	

1 *H. Draconis*,* S. P.

1884.								
Sept.	11	C	9 20	27.46	+81 50	14.2	W	

124. 30 *α Hydræ*.*

1885.								
Mar.	28	H	9 21	56.20	—8 9	38.9	E	
Apr.	3	H		56.20		....	E	
	4	H		56.17		39.3	E	
	5	H		56.10		37.1	W	

h *Ursæ Majoris*,* U. C.h *Ursæ Majoris*,* S. P.d *Ursæ Majoris*,*

1885.								
Mar.	28	H	9 24	18.07	....		E	

θ *Ursæ Majoris*,*

125. 32 τ^* *Hydrae*.

1885.						
Mar. 28	H	9 26	7.20	—0 40	40.8	E
Apr. 3	H		7.15		41.0	E
4	H		7.11		42.2	E
5	H		7.08		41.0	W
13	H		7.18		41.1	W

126. LL 18817

1885.						
Mar. 28	H	9 27	54.68	—20 36	24.0	E
Apr. 3	H		54.84		24.9	E
4	H		54.74		24.9	E
5	H		54.67		25.4	W
13	H		54.81		26.2	W

127. 38 κ *Hydrae*.

1885.							
Apr. 3	H	9 34	47.56	—18 48	39.0	E	
4	H		47.57		39.1	E	
5	H		47.57		40.0	W	
13	H		47.58		40.0	W	

 ϵ *Leonis*,*

1885.						
Mar. 28	H	9 39	19.35	+24 18	11.8	E
Apr. 3	H		19.36		11.1	E
4	H		19.35		11.1	E
5	H		19.35		11.9	W
13	H		19.29		11.3	W

 ν *Ursae Majoris*,*

1885.									
Mar. 28	H	9	42	48.18	+59	34	44.6	E	

128. 6 *Sextantis*,*

1885.						
Mar. 28	H	9 45	26.45	—3 42	17.5	E
Apr. 3	H		26.37		16.8	E
4	H		26.32		18.1	E
5	H		26.34		18.0	W
13	H		26.33		17.6	W

GR. 1586,* U. C.

1885.						
Mar. 28	H	9 48	4.96	+73 25	30.6	E
April 3	H		4.65		31.5	E
4	H		4.40		....	E
5	H		4.67		....	W
13	H		4.82		....	W

Gr. 1586,* S.P.

1884.								
July 25	C	9 47	59.04	+73 25	50.2		E	
26	C		59.29		....		E	
Sept. 8	C		58.71		48.5		W	
9	C		59.71		48.6		W	
1885.								
Aug. 18	H	48	4.63		....		E	
Sept. 13	H		4.88		32.8		E	
14	H		4.74		32.8		E	

129. Ll 19433.

1885.								
April 4	H	9 49	26.86	-18 27	55.3		E	
5	H		26.78		54.4		W	

130. 12 *Sextantis*.

1885.								
April 3	H	9 53	45.15	+3 56	3.0		E	
4	H		45.15		2.2		E	
5	H		45.14		3.0		W	
13	H		45.18		3.1		W	

131. 40 v^3 *Hydrae*.

1885.								
April 3	H	9 59	31.47	-12 30	25.6		E	
4	H		31.50		26.7		E	
5	H		31.50		26.9		W	
13	H		31.52		26.8		W	
May 4	H		31.43		27.0		W	

 η *Leonis*.*

1885.								
April 13	H	10 1	3.70		....		W	

132. 14 λ *Hydrae*.*

1885.								
April 3	H	10 4	58.92	-11 47	9.3		E	
4	H		58.92		9.6		E	
5	H		58.90		9.1		W	
13	H		58.95		8.9		W	
28	H		58.95		9.9		W	
May 4	H		58.83		9.7		W	

 λ *Ursae Majoris*.*

1885.								
April 3	H	10 10	9.50	+43 29	17.4		E	
28	H		9.46		16.5		W	
May 4	H		9.57		....		W	

133. 22 *Sextantis*.

1885. May 4	H	10 11	54.91	-7	29	42.0	W
----------------	---	-------	-------	----	----	------	---

 μ *Ursae Majoris*.*

1885. April 28	H	10 15	28.55	+42	4	38.6	W
May 4	H		28.50			38.0	W

134. 25 *Sextantis*.

1885. April 28	H	10 17	37.68	-3	29	36.1	W
May 4	H		37.78			37.6	W

135. 42 μ *Hydrae*.*

1885. April 28	H	10 20	28.81	-16	14	58.1	W
May 4	H		28.82			58.1	W

 α *Antliae*.*36 *Ursae Majoris*.*

1885. May 4	H	10 23	15.81			W
----------------	---	-------	-------	--	--	------	---

136. BRADLEY 1462.

9 H. *Draconis*,* U. C.9 H. *Draconis*,* S. P.

1884. June 25	C	10 25	12.35	+76	18	....	E
1885. Aug. 18	H		17.62			....	E

137. 44 *Hydrae*.

1885. Apr. 28	H	10 28	32.61	-28	9	10.5	W
------------------	---	-------	-------	-----	---	------	---

138. ϕ *Hydrae* 24 HEV.

1885. April 28	H	10 32	58.76	-16	16	47.6	W
May 4	H		58.73			48.3	W

139. 33 *Sextantis*.*

1885. April 28	H	10 35	33.21	-1 8	14.0	W
-------------------	---	-------	-------	------	------	---

42 *Leonis* *.

1885. May 12	H	10 39	28.14	+31 17	15.9	W
-----------------	---	-------	-------	--------	------	---

140. *Hydrae* 25 HEV.*

1885. April 28	H	10 43	57.05	-15 35	32.4	W
May 4	H		57.00		32.4	W
12	H		57.08		32.8	W

141. 41 *Sextantis*.142. b² *Hydrae*.

1885. April 28	H	10 47	51.99	-19 31	12.3	W
May 10	H		52.04		11.6	W
12	H		51.97		11.6	W

 β *Ursae Majoris* *.

1885. May 4	H	10 54	53.85	+56 59	54.3	W
10	H		53.75		54.4	W
12	H		53.79		55.0	W

143. 61 p² *Leonis*.

1885. Apr. 28	H	10 55	57.74	- 1 51	57.2	W
------------------	---	-------	-------	--------	------	---

 α *Ursae Majoris*,* U. C.

1885. May 4	H	10 56	37.37	+62 22	18.5	W
10	H		37.39		17.3	W
12	H		37.47		....	W

 α *Ursae Majoris*,* S. P.

1885. Sept. 18	H	10 56	37.25	+62 22	18.8	E
14	H		37.37		18.9	E

χ Leonis.*

1885.								
Apr. 28	H	10	59	5.07	+ 7	57	25.9	W
May 10	H			5.12			25.6	W
May 12	H			5.14			26.5	W

 ψ Ursae Majoris.*144. 11 β Crateris.*

1885.								
Apr. 28	H	11	5	0.18	-22	11	58.6	W
May 10	H			0.12			52.2	W
May 12	H			0.09			52.4	W

145. 74 ϕ Leonis.

1885.								
Apr. 28	H	11	10	48.84	- 3	1	23.4	W
May 10	H			49.00			23.4	W
12	H			48.92			25.1	W
13	H			48.82			22.8	E

146. 12 δ Crateris.*

1885.								
Apr. 28	H	11	13	35.43	-14	9	23.5	W
May 10	H			35.46			22.3	W
12	H			35.45			23.4	W
13	H			35.43			23.1	E

GROOMBRIDGE 1771,* U. C.

GROOMBRIDGE 1771,* S. P.

1885.								
Sept. 13	H	11	16	0.84	+64	57	35.3	E
14	H			0.85			36.8	E

147. 15 γ Crateris.*

1885.								
Apr. 28	H	11	19'	8.21	-17	3	9.3	W
May 10	H			8.20			8.7	W
12	H			8.18			9.5	W
13	H			8.18			9.3	E

148. 16 k Crateris.*

1885.								
Apr. 28	H	11	21	21.92	-11	43	29.7	W
May 10	H			21.97			29.5	W
12	H			21.98			30.6	W
13	H			21.89			29.6	E

149. 87 *e Leonis*.

1885.								
Apr. 28	H	11	24	26.29	— 2	22	8.9	W
May 10	H			26.34			10.4	W

 λ *Draconis*.*

1885.								
May 13	H	11	24	33.76			.....	E

 ξ *Hydrae*.*

1885.								
May 13	H	11	27	20.84	—31	12	17.1	..

150. 21 γ *Crateris*.

1885.								
Apr. 28	H	11	30	50.87	— 9	9	59.9	W
May 10	H			50.88			60.3	W
12	H			50.92			60.5	W
13	H			50.87			59.1	E

3 *Draconis*.* U. C.

1884.								
May 8	H	11	35	59.85	+67	23	....	E
1885.								
Apr. 28	H		36	3.29			....	W

3 *Draconis*.* S. P.151. 27 ζ *Crateris*.

1885.								
Apr. 28	H	11	38	55.97	—17	42	40.2	W
May 10	H			56.05			40.0	W
12	H			56.04			41.0	W
13	H			56.09			42.0	E

 χ *Ursae Majoris*.*152. 5 β *Virginis*.*

1884.								
May 8	H	11	44	39.14	+ 2	25	5.1	E
10	H			39.09			4.5	E
1885.								
Apr. 28	H			42.26		24	46.0	W
May 10	H			42.29			45.4	W
12	H			42.24			45.4	W
13	H			42.31			45.5	E

 β *Hydrae*.

153. 30 η Crateris.

1884.						
May 8	H	11 50	6.29	—16 30	18.3	E
10	H		6.27		17.9	E
13	H		6.23		18.9	E
1885.						
Apr. 28	H		9.26		38.0	W
May 10	H		9.25		37.8	W
12	H		9.24		38.9	W

154. Ll. 22585.

1884.						
May 10	H	11 54	47.81	- 9 47	6.7	E
13	H		47.19		5.7	E
1885.						
Apr. 28	H		50.31		25.9	W
May 10	H		50.32		25.6	W
12	H		50.36		27.8	W
13	H		50.36		28.1	E

155. M. 499.

1884.						
May 8	H	12 0	3.43	- 2 29	6.4	E
10	H		3.50		7.8	E
13	H		3.35		7.5	E
1885.						
Apr. 28	H		6.39		26.1	W
May 10	H		6.48		28.0	W
12	H		6.50		27.4	W

156. 2 ϵ Corvi.*

1884.						
May 10	H	12 4	9.62	-21 58	27.9	E
13	H		9.60		27.8	E
26	H		9.42		28.7	W
28	H		9.58		28.4	W
1885.						
Apr. 28	H		12.58		48.1	W
May 12	H		12.61		49.7	W
13	H		12.70		48.6	E

4 H. Draconis,* U. C.

1884.						
May 8	H	12 6	44.70	+78 15	38.9	E
28	H		45.16		...	W
30	H		45.00		40.0	W
1885.						
Apr. 28	H		48.04		19.9	W
May 10	H		48.03		19.2	W
12	H		48.43		20.5	W
13	H		47.75		...	E

4 H. *Draconis*,* S. P.

1884.							
July 19	C	12	6	44.94	+78	15	.... W
30	C			45.21			40.8 W
Oct. 2	C			45.16			38.7 E
5	C			44.74			40.8 W
10	C			45.08			39.8 W
1885.							
Sept. 14	H			47.88			18.9 E
Oct. 22	H			48.01			20.5 E

157. 4 γ *Corvi*.*

1884.							
May 10	H	12	9	50.44	-16	53	52.3 E
13	H			50.45			52.5 E
26	H			50.38			52.7 W
27	H			50.51			53.2 W
28	H			50.46			52.7 W
30	H			50.51			52.3 W
1885.							
May 12	H			53.56		54	11.8 W
13	H			53.55			12.8 E

158. 15 η *Virginis*.*

1884.							
May 8	H	12	13	58.21	-0	1	20.0 E
13	H			58.31			20.3 E
26	H			58.24			19.8 W
27	H			58.36			20.4 W
1885.							
May 10	H		14	1.31			40.8 W

159. P., XII^b, 54.

1884.							
May 10	H	12	14	56.44	-12	55	20.0 E
13	H			56.36			19.4 E
28	H			56.43			20.4 W
30	H			56.43			19.8 W
1885.							
Apr. 28	H			59.40			39.6 W
May 13	H			59.50			40.0 E

160. M. 510.

1884.							
May 10	H	12	21	54.48	-3	58	24.4 E
13	H			54.53			24.3 E
28	H			54.52			24.8 W
30	H			54.51			24.6 W
1885.							
May 10	H			57.48			45.0 W
13	H			57.58			44.0 E

161. 7 δ *Corvi*.*

1884.								
May 8	H	12	23	51.78	-15	52	10.3	E
10	H			51.78			10.8	E
13	H			51.75			10.6	E
26	H			51.72			10.5	W
27	H			51.72			10.3	W
28	H			51.77.			10.8	W
30	H			51.76			10.5	W

162. 9 β *Corvi*.*

1884.								
8	H	12	28	17.67	-22	45	18.6	E
10	H			17.66			18.3	E
26	H			17.65			18.2	W
27	H			17.70			17.8	W
28	H			17.68			18.7	W
1885.								
May 13	H			20.81			38.5	E

k Draconis.* U. C.

1884.								
May 13	H	12	28	31.54	+70	25	38.5	E

k Draconis.* S. P.

1884.								
July 27	C	12	28	31.59	+70	25	39.9	E
Sept. 12	C			31.58			....	W
17	C			31.93			....	W
19	C			31.61			42.5	W
20	C			31.47			41.4	E
24	C			31.65			43.0	E
28	C			31.64			....	E

LAC. 5225 (B. A. C. 4253).

1884.								
May 28	H	12	31	.....	-26	29	50.9	W
30	H			.....			51.9	W
1885.								
May 13	H			.....		30	12.2	E
23	H			.....			11.5	E

163. 26 χ *Virginia*.

1884.								
May 8	H	12	33	15.58	-7	21	26.1	E
10	H			15.58			25.4	E
13	H			15.63			25.8	E
26	H			15.51			25.0	W
28	H			15.66			26.0	W
30	H			15.56			25.2	W
June 3	H			15.62			25.9	W

76 *Ursae Majoris*,* U. C.

1885.								
May 22	H	12	36	32.12	+63	20	40.3	E

76 *Ursae Majoris*,* S. P.

1885.								
Oct. 23	H	12	36	32.16	+63	20	42.0	E

164. M. 522.

1884.								
May 10	H	12	41	33.71	— 5	40	0.5	E
13	H			33.74			0.5	E
26	H			33.67			...	W
28	H			33.76			0.4	W
30	H			33.73			0.4	W
June 3	H			33.77			1.2	W

165. 40 ψ *Virginis*.

1884								
May 10	H	12	48	19.34	— 8	54	31.2	E
23	H			19.28			32.4	E
28	H			19.27			31.2	W
30	H			19.33			31.8	W
June 3	H			19.25			32.4	W
1885.								
May 13	H			22.33.22			51.9	E

 ϵ *Ursae Majoris*.*

1884.								
May 26	H	12	48	55.35	+56	35	21.2	W
27	H			55.40			22.6	W

166. 43 δ *Virginis*.*

1884.								
May 10	H	12	49	45.63	+ 4	1	40.9	E
13	H			45.66			40.6	E
28	H			45.60			39.7	W
30	H			45.65			39.9	W
1885.								
May 21	H			48.57			21.1	E
22	H			48.59			20.4	E

12 *Canum Venaticorum* seq.*

1885.								
May 13	H	12	50	38.73	+38	56	22.9	E

8 *Draconis*.*

1885.								
May 25	H	12	50	53.77	+06	3	45.5	W

 ϵ *Virginis*.*

1884.								
May 8	H	12	56	24.17	+11	34	58.6	E
1885.								
May 25	H			27.17			38.2	W

167. LL 24277.

1884.								
May 10	H	12	57	33.41	-19	57	36.9	E
13	H			33.44			36.4	E
28	H			33.34			36.5	W
30	H			33.39			37.1	W
June 3	H			33.40			37.8	W
1885.								
May 13	H			36.70			56.5	E

168. 51 γ *Virginis*.*

1884.								
May 8	H	13	3	56.62	-4	55	9.9	E
10	H			[56.48:x]			9.6	E
13	H			56.69			10.4	E
26	H			56.83			10.8	W
27	H			56.63			9.8	W
28	H			56.60			10.5	W
30	H			56.64			10.2	W
June 3	H			56.66			10.7	W
1885.								
May 13	H			59.77			28.8	E
21	H			59.66			30.5	E
25	H			59.75			29.6	W
June 1	H			59.67			29.9	E

169. 53 *Virginis*.

1884.								
May 10	H	13	5	53.17	-15	34	21.3	E
13	H			53.22			21.5	E
28	H			53.10			21.5	W
30	H			53.17			21.1	W
June 3	H			53.19			22.2	W
1885.								
May 21	H			56.26			41.1	E

170. 46 γ *Hydrae*.*

1884.							
May 10	H	13 12	37.12	—22 33	32.8	E	
13	H		37.02		33.4	E	
28	H		36.88		32.6	W	
20	H		36.92		32.9	W	
June 3	H		36.99		33.7	W	
1885.							
May 21	H		40.24		52.3	E	
June 1	C		40.24		51.7	W	

171. 67 α *Virginis*.*

1884.						
May 10	H	13 19	4.89	-10 33	19.6	E
13	H		4.97		19.9	E
30	H		4.92		20.5	W
June 3	H		4.83:x		20.2	W
1885.						
May 21	H		8.13		38.6	E
25	H		8.16		38.8	W
June 1	C		8.07		38.5	E

172. 72 *Virginis*.

1884.						
May 10	H	13 24	[22.47:x]	- 5 52	16 7	E
13	H		22.61:x		17.2	E
28	H		22.54		16.3	W
30	H		22.59		16.4	W
1885.						
May 22	H		25.70		35.4	E
25	H		25.73		35.4	W
June 1	C		25.70		35.5	E

173. 73. *Virginis*.

1884.						
May 10	H	13 25	47.57	-18 7	50.2	E
13	H		47.58		50.4	E
28	H		47.37		49.1	W
June 3	H		47.58		50.1	W
1885.						
May 21	H		50.77	8	7.5	E
25	H		50.81		8.5	W

174. 79 ζ *Virginis*.*

1884.						
May 8	H	13 28	[46.79:x]	- 0 0	8.9	E
10	H		46.88		8.9	E
27	H		46.82		8.8	W
28	H		46.94		9.0	W
June 3	H		46.93		9.4	W
1885.						
May 21	H		49.99		27.3	E
25	H		49.99		27.0	W
June 1	C		50.00		27.7	E

24 *Canum Venaticorum.*

1884.								
May 30	H	13	29	.....	+49	36	34.2	W
June 12	C			.....			34.2	E
13	C			.....			34.9	E
14	C			.....			35.1	E
1885.								
May 22	H			.....			16.0	E

175. 82 *m Virginis.*

1884.								
May 10	H	13	35	31.38	— 8	7	2 0	E
13	H			31.48			3.5	E
27	H			31.40			2.0	W
28	H			31.47			1.8	W
30	H			31.42			2.1	W
June 3	H			31.49			2.3	W
1885.								
June 1	C			34.58			20.4	E

ι Centauri.

1884.								
June 3	H	13	39	.....	—32	27	22.8	W
6	C			.....			22.7	W
7	C			.....			23.2	W
12	C			.....			22.4	E
13	C			.....			21.1	E
14	C			.....			23.3	E
1885.								
May 21	H			.....			42.2	E
22	H			.....			42.9	E
25	H			.....			42.0	W
June 1	C			.....			41.7	E

*τ Bootis.**

1884.								
May 8	H	13	41	45.05	+18	2	5.9	E

*η Ursae Majoris.**

1884.								
May 27	H	13	42	53.18	+49	53	32.8	W
June 6	C			.....			33.6	W
7	C			.....			33.3	W
12	C			.....			34.3	E
13	C			.....			33.6	E
14	C			.....			34.9	E
1885.								
May 22	H			.....			15.6	E
June 1	C	43		0.33			15.7	E

176. 89 *Virginis*.*

1884.							
May 10	H	13 43	34.17	—17 33	21.6	E	
13	H		34.16		21.4	E	
30	H		34.16		21.4	W	
June 3	H		34.17		21.3	W	
1885.							
May 21	H		37.36		38.8	E	
25	H		37.41		40.2	W	

177. 90 p *Virginis*.

1884.							
May 10	H	13 48	44.64	— 0 55	54.8	E	
13	H		44.65:x		53.2	E	
27	H		[44.56:x]		53.6	W	
28	H		44.77		54.3	W	
30	H		44.70		54.9	W	
1885.							
May 21	H		47.86		12.5	E	
25	H		47.82		12.4	W	

178. 47 *Hydrae*.

1884.							
May 10	H	13 52	0.64	—24 24	18.9	E	
13	H		0.69		18.8	E	
28	H		0.52		19.0	W	
30	H		0.62		19.6	W	
1885.							
May 21	H		3.97		...	E	
25	H		3.96		37.4	W	

179. 93 τ *Virginis*.*

1884.							
May 10	H	13 55	[44.40:x]	+ 2 6	22.0	E	
13	H		44.55		22.9	E	
28	H		44.64		22.6	W	
30	H		44.57		22.4	W	
1885.							
May 21	H		47.65		5.0	E	
22	H		47.66		4.9	E	
25	H		47.67		5.5	W	
June 1	C		47.66		5.3	E	

 π *Hydrae*.

1884.							
June 3	H	13 59	.....	—26 7	22.0	W	
5	C		.....		22.0	W	
7	C		.....		21.4	W	
12	C		.....		22.4	E	
13	C		.....		22.1	E	
14	C		.....		21.5	E	
1885.							
May 21	H		.....		40.2	E	
22	H		.....		39.1	E	
June 1	H		..		40.2	E	

PUBLICATIONS OF THE

 α *Draconis*,* U. C.

1884.								
May 13	H	14	1	14.81	+64	55	50.1	E
80	H			14.96			50.2	W
1885.								
May 25	H			16.55			33.6	W

 α *Draconis*,* S. P.

1884.								
Oct. 22	H	14	1	16.45	+64	55	34.0	E

180. *Virginis*, 40 Hev.

1884.								
May 10	H	14	4	30.32	-15	45	12.2	E
13	H			30.29			12.9	E
28	H			30.24			13.8	W
30	H			30.36			13.7	W
June 3	H			30.28			13.3	W
1885.								
May 21	H			33.61			29.9	E

181. 98 *h Virginis*.*

1884.								
May 10	H	14	6	[42.31:x]	- 9	43	59.6	E
13	H			42.37			59.8	E
30	H			42.48			60.2	W
June 3	H			42.52			60.4	W
5	C			42.53			60.2	W
1885.								
May 21	H			45.70		44	16.8	E
22	H			45.73			15.9	E

4 *Ursae Minoris*,* U. C.

1884.								
June 5	C	14	9	18.84	+78	5	33.4	W
1885.								
May 21	H			18.56			....	E
22	H			18.71			17.1	E

4 *Ursae Minoris*,* S. P.

1884.								
Nov. 15	H	14	9	18.98	+78	5	33.5	E

182. 99 ι *Virginis*.*

1884.							
May 10	H	14	9	55.86	— 5	26	47.7 E
13	H			55.93			47.4 E
30	H			55.91			47.8 W
June 3	H			55.85			47.6 W
1885.							
May 25	H			59.05	27	5.2	W
June 1	C			59.12		6.1	E

 λ *Bootis*.*

1884.							
June 6	C	14	11	.....	+46	37	16.5 W
7	C			.....			17.1 W
11	C			58.41			16.3 W
12	C			.....			16.7 E
13	C			.....			16.2 E
14	C			.....			15.4 E
1885.							
May 22	H	12		0.68		0.4	E
June 1	C			0.56		0.2	E

183. 2 *Librae*.

1884.							
May 10	H	14	17	11.05	—11	11	1.4 E
13	H			11.15			1.4 E
30	H			11.08			1.8 W
June 3	H			11.12			1.3 W
5	C			11.17			0.5 W
1885.							
May 21	H			13.38		17.6	E

 ς *Bootis*.*

1884.							
June 6	C	14	21	.....	+52	23	14.2 W
7	C			.....			14.1 W
12	C			.....			14.6 E
13	C			.....			14.2 E
14	C			.....			15.3 E
1885.							
May 22	H			16.94	22	58.3	E
23	H			16.76		57.2	E
June 1	C			16.80		58.1	E

184. 105 ϕ *Virginis*.*

1884.							
May 10	H	14	22	13.47	— 1	42	27.2 E
13	H			13.55			27.1 E
June 3	H			13.52			27.2 W
5	C			13.53			26.7 W
1885.							
May 21	H			16.59		43.1	E
25	H			16.59		42.9	W

185. M. 575

1884.						
10	H	14 28	19.17	—19 55	46.4	E
13	H		19.08		46.0	E
June 3	H		19.12		47.2	W
5	C		19.07		47.6	W
1885.						
May 22	H		22.38	56	2.0	E
25	H		22.42		3.1	W

186. 107 μ Virginis.*

1884.						
May 2	H	14 36	56.83	— 5 9	13.2	E
10	H		56.79		11.2	E
13	H		56.85		12.1	E
June 3	H		[56.67 α]		11.5	W
5	C		56.82		11.6	W
11	C		56.87		11.7	W
1885.						
21	H		60.07		27.3	E
May 23	H		60.01		28.4	E
25	H		59.98		27.2	W

187. 109 Virginis.*

1884.						
May 10	H	14 40	23.04	+ 2 22	55.5	E
13	H		23.09		56.9	E
June 3	H		23.05		56.8	W
5	C		23.07		56.1	W
6	C		23.08		56.1	W
7	C		22.04		55.9	W
1885.						
May 22	H		26.11		40.6	E
25	H		26.14		40.8	W

188. 9 α Librae.*

1884.						
May 2	H	14 44	27.74	—15 33	32.2	E
10	H		27.69		31.6	E
13	H		27.66		32.7	E
June 3	H		27.70		32.5	W
5	C		27.68		32.6	W
6	C		27.78		32.5	W
7	C		27.68		32.8	W
1885.						
May 23	H		31.01		....	E
25	H		30.98		....	W

GROOMBRIDGE 2164,* U. C.

1885.						
May 25	H	14 48	31.38	+59 45	41.3	W

GROOMBRIDGE 2164,* S. P.

189. 15 *Librae*.

1884.								
May	2	H	14 50	28.35	—10 56	27.6	E	
	13	H		[28.29: <i>x</i>]		27.0	E	
June	5	C		28.49		26.5	W	
	6	C		28.57		26.5	W	
	11	C		28.52		25.5	W	
1885.								
May	22	H		31.06		40.7	E	
	23	H		31.74		41.7	E	

 β *Ursae Minoris*,* U. C.

1884.								
June	3	H	14 51	3.17	+74 37	46.6	W	

 β *Ursae Minoris*,* S. P.

1884.								
Sept.	17	C	14 51	3.29	+74 37	....	W	
Nov.	7	H		3.14		48.4:	W	
	18	H		3.11		....	E	

190. 19 δ *Librae*.

1884.								
May	2	H	14 54	46.53	— 8 3	29.6	E	
	13	H		[46.41: <i>x</i>]		29.0	E	
June	5	C		46.51		28.9	W	
	6	C		46.52		28.7	W	
	7	C		46.52		29.6	W	
1885.								
May	22	H		49.68		42.4	E	
	23	H		49.72		43.5	E	

191. γ *Scorpii*, 1 HEV.*

1884.								
May	2	H	14 57	16.91	—24 49	30.3	E	
	10	H		16.97		32.1	E	
June	6	C		16.90		30.4	W	
	7	C		16.92		30.4	W	
1885.								
May	22	H		20.32		46.0	E	
	23	H		20.41		45.5	E	

 ψ *Bootis*,*

1884.								
June	5	C	14 59	28.55: <i>x</i>	+27 24	1.3	W	
	6	C		28.53		1.6	W	

k *Bootis*.

1884.								
June 6	C	15	1	.....	+48	35	57.3	W
7	C			.....			58.3	W
11	C			.....			58.3	W
12	C			.....			58.4	E
13	C			.....			58.5	E
14	C			.....			58.8	E
1885.								
May 23	H			.....			44.4	E
June 1	C			....			45.1	E

192. 24 ι *Librae*.*

1884.								
May 2	H	15	5	36.51	-19	21	6.6	E
13	H			36.42			6.8	E
June 6	C			36.58			6.9	W
7	C			36.61			8.7	W
11	C			36.59			7.0	W
1885.								
May 22	H			39.90			20.4	E

193. 27 β *Librae*.*

1884.								
May 2	H	15	10	45.88	-	8	57	15.7
10	H			45.99				15.0
June 5	C			45.91:z				15.9
6	C			45.89				15.2
7	C			45.94				15.2
1885.								
May 22	H			49.18				28.5
								E

1 H. *Ursae Minoris*.*

1884.								
May 13	H	15	13	18.37	+67	47	15.1	E
June 5	C			18.57			14.1	W
6	C			18.78			14.6	W
7	C			18.63			14.6	W
1885.								
May 23	H			19.17			1.2	E

11 *Ursae Minoris*, U. C.11 *Ursae Minoris*, S. P.

1884.								
Oct. 2	C	15	17	11.55	-72	14	40.9	E
5	C			11.82			....	W
Nov. 11	H			11.89			....	W
15	H			11.46			41.5	E

194. 8 *Serpentis*.

1884.						
May 10	H	15 17	44.99	— 0 36	29.7	E
13	H		44.90		28.8	E
June 5	C		44.97		29.3	W
6	C		44.97		29.1	W
7	C		44.89: <i>x</i>		29.4	W
1885.						
May 22	H		47.95		41.5	E

 γ *Ursae Minoris*,* U. C.

1885.						
May 22	H	15 20	55.15	+72 14	35.8	E

 γ *Ursae Minoris*,* S. P.

1884.						
Sept. 24	C	15 20	54.75	+72 14	49.8	E
28	C		54.91		48.7	E
Oct. 5	C		55.29		50.1	W
10	C		55.34		48.7	W
Nov. 20	H		54.89		50.9	E
30	H		55.39		51.1	E
Dec. 2	H		55.13		49.2	E
3	H		55.14		48.4	E
9	H		55.27		50.5	E
31	H		55.10		49.1	W
1885.						
Jan. 2	H		55.20		35.8	W
8	C		55.25		....	W
9	C		55.21		....	W

195. 32 *Librae*.

1884.						
May 2	H	15 21	42.79	—16 18	41.4	E
13	H		42.81		40.8	E
June 5	C		42.87		40.2	W
6	C		42.95		40.2	W
7	C		42.86		40.8	W
1885.						
May 23	H		46.18		53.4	E

 ι *Draconis*,* U. C. ι *Draconis*,* S. P. β *Coronae borealis*,* γ^1 *Bootis*,*

1885.						
May 23	H	15 26	47.93	+41 13	32.3	E
25	H		47.89		32.1	W

196. 37 *Librae*.

1884.								
May 2	H	15	27	50.28	— 9	39	59.6	E
13	H			50.22			59.7	E
June 5	C			50.33			59.2	W
6	C			50.33			57.9	W
7	C			50.27			58.5	W
1885.								
May 23	H			53.59		40	11.1	E

 γ *Librae*.*

1885.								
May 22	H	15	29	5.54	—14	24	19.5	E
25	H			5.57			19.6	W

 α *Coronae borealis*.*

1884.								
June 6	C	15	29	46.53	+27	6	20.8	W

197. 41 *Librae*.

1884.								
May 2	H	15	32	13.94	—18	55	8.6	E
13	H			13.88			8.0	E
June 6	C			13.97			8.4	W
9	C			13.81			8.5	W
1885.								
May 23	H			17.37			20.7	E
25	H			17.54			21.3	W

 ψ *Lupi*.

1884.								
June 9	C	15	33	.....	—34	1	...	W
10	C			.....			53.6	W
11	C			.....			54.5	W
12	C			.....			54.9	E
13	C			.....			55.9	E
14	C			.....			55.5	E
1885.								
June 1	C			.....		2	6.8	E

198. 44 η *Librae*.

1884.								
May 2	H	15	37	32.89	—15	18	8.1	E
13	H			32.83			8.5	E
June 6	C			32.92			7.3	W
7	C			32.85			8.5	W
11	C			32.83.2			6.7	W
1885.								
May 23	H			36.18			20.1	E

β *Serpentis*.*

1885.								
May 23	H	15	40	52.81	+15	46	56.9	E

 κ *Serpentis*.*199. 32 μ *Serpentis*.*

1884.								
May 2	H	15	43	34.04	- 3	4	28.3	E
3	H			34.01			28.2	E
15	H			33.96			28.0	E
June 5	C			33.98:x			26.7	W
6	C			34.02			27.8	W
7	C			34.02			28.3	W

 χ *Lupi*.

1884.								
June 10	C	15	43	.....	-33	16	18.5	W
11	C			.....			20.6	W
12	C			.....			21.2	E
13	C			.....			21.0	E
14	C			.....			21.7	E
1885.								
May 23	H			.....			34.2	E
25	H			.....			32.9	W
June 1	C			.....			34.2	E

12 *H. Draconis*,* U. C.12 *H. Draconis*,* S. P.200. 37 ε *Serpentis*.*

1884.								
May 2	H	15	45	2.07	+ 4	49	40.0	E
13	H			2.01			38.8	E
15	H			2.05			38.6	E
June 5	C			[1.90:x]			38.7	W
6	C			2.05			39.5	W
7	C			1.96			39.2	W
1885.								
May 25	H			5.08			28.0	W

 ζ *Ursae Minoris*,* U. C.

1884.								
May 13	H	15	48	12.93	+78	9	3.1	E
19	H			13.80			3.2	E
June 5	C			13.25			3.6	W
6	C			13.15			3.2	W
7	C			13.18			2.7	W
9	C			13.27			2.9x	W
11	C			13.28			2.5	W

ζ *Ursae Minoris*,* S. P.

1884.								
Nov. 13	H	15	48	13.47	+78	9	4.6	W

201. 48 *Librae*.

1884.								
May 2	H	15	51	41.64	-13	56	37.9	E
15	H			41.60			36.9	E
June 6	C			41.68			37.6	W
7	C			41.63			37.9	W
9	C			41.56			37.6	W
1885.								
May 25	H			45.03			48.6	W

202. 7 δ *Scorpii*.*

1884.								
May 2	H	15	53	28.48	-22	17	26.3	E
15	H			28.51			25.6	E
June 5	C			28.54:x			25.6	W
6	C			28.48			26.6	W
7	C			28.45:x			26.0	W
1885.								
May 23	H			32.08			36.2	E
25	H			31.97			....	W

203. 8 β *Scorpii pr.**

1884.								
May 15	H	15	58	41.49	-19	29	11.6	E
19	H			41.52			15.1	E
June 5	C			41.50:x			13.1	W
6	C			41.53			13.3	W
7	C			41.58			13.5	W
1885.								
May 23	H			45.01			24.1	E
June 1	C			45.07			22.6	E

 ν *Herculis*.

1884.								
June 9	C	15	59	.....	+46	21	31.3	W
10	C			.....			34.9	W
11	C			.....			33.0	W
12	C			.....			32.7	E
13	C			.....			33.4	E
14	C			.....			32.9	E
1885.								
May 25	H			.....			22.4	W

204. 11 *Scorpii*.

1884.							
May 15	H	16	1	9.85	-12	25	56.2 E
19	H			9.88			56.0 E
June 5	C			9.88			57.8 W
6	C			9.93			58.3 W
7	C			9.96			57.7 W
1885.							
May 23	H			13.19	26	7.7	E

205. 1 δ *Ophiuchi*.*

1884.							
May 2	H	16	8	16.13	- 3	23	40.9 E
15	H			16.05			41.3 E
19	H			16.08			41.2 E
June 5	C			16.06			... W
6	C			16.03			42.3 W
7	C			16.06			41.9 W
9	C			15.90			42.4 W
1885.							
May 23	H			19.13			... E
June 1	C			19.12			51.6 E

206. 2 ε *Ophiuchi*.*

1884.							
May 15	H	16	12	11.03	- 4	24	32.2 E
19	H			11.60			33.0 E
June 5	C			11.10			32.1 W
6	C			10.98			32.3 W
7	C			11.03			31.7 W
1885.							
May 23	H			14.21			41.8 E
June 1	C			14.26			41.0 E

19 *Ursae Minoris*,* U. C.

1884.							
May 2	H	16	14	8.69	+76	10	9.0 E
15	H			8.25			... E
June 6	C			8.56			7.7 W
7	C			8.62			... W
9	C			8.74			9.8 W
July 10	C			8.72			8.6 E
1885.							
May 25	H			7.03			0.1 W

19 *Ursae Minoris*,* S. P.

1884.							
Dec. 8	H	16	14	8.71	+ 76	10	.... E

τ *Herculis*.*

1884.								
June 10	C	16	16	15.19	+46	35	24.9	W
11	C			15.26			24.6	W
12	C			.....			23.3	E
13	C			.....			25.5	E
14	C			.....			23.6	E
July 13	C			.....			24.1	W
1885.								
June 1	C			17.04			15.8	E

207. 4 ψ *Ophiuchi*.

1884.						
May 2	H	16 17	18.96	-19 45	52.4	E
19	H		18.85		52.0	E
June 6	C		18.85		55.3	W
7	C		18.99		54.5	W
9	C		18.85		54.5	W
1885.						
May 23	H		22.71	46 2 0		E

208. 21 α *Scorpii*.*

1884.						
May 2	H	16 22	17.67	-26 10	25.6	E
19	H		17.70		24.8	E
June 6	C		17.78		23.4	W
7	C		17.75		22.6	W
9	C		17.67		23.4.2	W
10	C		17.72		23.7	W
11	C		17.80		24.5	W
12	C		.....		24.7	E
13	C		.....		22.6	E
14	C		.....		25.4	E
July 10	C		17.64		24.4	E
1885.						
May 23	H		21.40		....	E
June 1	C		21.43		32.8	E

 η *Draconis*,* U. C. η *Draconis*,* S. P209. 8 ϕ *Ophiuchi*.

1884.						
May 2	H	16 24	30.02	-16 21	31.5	E
15	H		29.96		32.1	E
19	H		29.97		31.6	E
June 6	C		30.01		32.6	W
7	C		30.03		32.2	W
9	C		29.84		31.9	W

*β Herculis.**

1885.							
May 23	H	16	25	16.59	+21	44	27.0 E

*A Draconis.**

1884.							
June 6	C	16	28	12.70	+69	1	7.9 W
7	C			12.66			8.2 W
July 9	C			12.68			8.4 E
10	C			12.77			9.0 E
13	C			12.77			8.0 W
1885.							
May 23	H			12.54			1.5 E
25	H			12.78			1.0 W

210. 12 Ophiuchi.

1884.							
May 2	H	16	30	15.95	-2	4	34.0 E
19	H			15.87			33.5 E
June 6	C			15.89			35.3 W
9	C			15.79			34.3 W
July 13	C			16.05			33.9 W
1885.							
June 1	C			19.11			41.9 E

*211. 31 ζ Ophiuchi.**

1884.							
May 15	H	16	30	46.34	-10	19	52.2 E
June 10	C			46.27			52.7 W
11	C			46.32			52.8 W
July 9	C			[46.15 \pm]			52.4 E
10	C			46.36			52.9 E
1885.							
May 23	H			49.58		20	0.3 E
25	H			49.58			0.0 W

212. 24 Scorpii.

1884.							
May 2	H	16	34	51.96	-17	30	59.7 E
15	H			51.84			59.9 E
June 9	C			51.68			60.0 W
10	C			51.87			60.3 W
1885.							
May 25	H			55.25		31	8.3 W
June 1	C			55.31			8.4 E

LL. 30351 = W₁ B. 16^a, 655.

1884.							
May 19	H	16	35	23.72	+1	28	17.8 E

213. 14 *Ophiuchi*.

1884.								
June 11	C	16	35	50.02	+ 1	24	12.3	W
July 10	C			49.98 ₂₂			10.4	W
13	C			50.05			13.7	E
1885.								
May 25	H			53.01			....	W
June 1	C			53.09			5.8	E

 η *Herculis*.*

1885.								
May 25	H	16	38	57.23	+39	8	30.1	W

 ε *Scorpii*.

1884.								
July 10	C	16	42	.....	-34	4	53.7	E
1885.								
June 1	C			.....		5	0.4	E

214. 20 *Ophiuchi*.

1884.								
May 2	H	16	43	24.97	-10	34	36.0	E
15	H			24.96			36.6	E
19	H			24.89			36.5	E
June 9	C			24.91			36.8	W
10	C			25.02			38.0	W
1885.								
May 25	H			28.28			42.7	W

49 *Herculis*.*

1884.								
July 13	C	16	46	48.06	+15	10	10.4	W
1885.								
May 25	H			50.75			....	W

215. 24 *Ophiuchi*.

1884.								
May 2	H	16	49	48.21	-22	57	52.7	E
15	H			48.18			52.7	E
19	H			48.30			53.4	E
June 5	C			48.23			53.8	W
9	C			48.24			54.5	W
10	C			48.23			54.9	W
11	C			48.29			54.1	W

 κ *Ophiuchi*.*

1885.								
May 25	H	16	52	13.48	+ 9	33	15.6	W

W₁ B.: 16^b, 981.

1884.							
May 2	H	16 53	42.04	— 4	2	44.0	E

216. 30 *Ophiuchi*.

1884.							
May 15	H	16 54	56.55	— 4	2	51.1	E
19	H		56.57			51.2	E
June 5	C		56.62			50.8	W
9	C		56.53			51.5	W
11	C		56.65			51.7	W
1885.							
June 1	C		59.81			58.1	E

 ϵ *Herculis*.*

1885.							
May 25	H	16 55	53.37	+81	5	48.1	W

 ϵ *Ursae Minoris*,* U. C.

1884.							
May 15	H	16 57	43.04	+82	13	34.2	E
19	H		43.32			34.5	E
June 9	C		43.42			36.5	W
10	C		43.41			35.0	W
July 13	C		43.89			34.1	W
1885.							
May 25	H		47.21			....	W
June 1	C		47.27			29.0	E

 ϵ *Ursae Minoris*,* S. P.

1884.							
Nov. 7	H	16 57	43.75	+82	13	....	W
27	H		43.25			....	E

217. 35 η *Ophiuchi*.*

1884.							
May 15	H	17 3	43.42	—15	34	47.7	E
19	H		43.56			48.6	E
June 5	C		43.54			47.9	W
9	C		43.53			49.1	W
July 9	C		43.51			48.5	E
10	C		43.59			48.2	E
12	C		43.48			48.1	W
1885.							
June 1	C		47.04			54.4	E

ζ *Draconis*.*

1884.								
June 5	C	17	8	27.02	+65	51	26.8	W
9	C			27.19			27.8	W
1885.								
May 30	C			27.35			23.7	W
June 13	C			27.33			23.0	E
21	C			.....			22.9	E
25	C			.....			23.2	W
29	C			.....			22.9	W
July 3	U			.....			23.4	W
9	U			.....			23.5	W

 α *Herculis*.*

1884.								
July 10	C	17	9	21.44	+14	31	24.2	E
1885.								
June 1	C			24.19			18.9	E

 γ 41 *Ophiuchi*.

1884.								
May 15	H	17	10	39.36	— 0	18	46.6	E
19	H			39.27			48.2	E
June 5	C			39.43			48.8	W
9	C			39.27			49.8	W
10	C			39.39			49.1	W
1885.								
May 30	C			42.44			51.4	W

 π *Herculis*.*

1885.								
June 1	C	17	11	2.47	+36	56	20.7	E
13	C			2.48			21.0	E
18	U			.....			21.5	E
21	C			.....			21.4	E
25	C			...			21.0	W
29	C			.....			21.2	W
July 3	U			.....			20.1	W
9	U			.....			20.8	W
Aug. 17	H			2.50			....	E

 γ 40 ξ *Ophiuchi*.

1884.								
May 15	H	17	14	3.09	—20	59	13.1	E
19	H			3.10			13.3	E
June 5	C			3.09			14.1	W
9	C			3.02			14.9	W
10	C			3.04			15.7	W
1885.								
May 30	C			6.52			18.3	W

γ *Ophiuchi*.*

1884.								
July 10	C	17	14	53.15	-24	52	56.9	E
1885.								
Aug. 17	H			56.83			....	E

220. *Ophiuchi*, 27 Hev.

1884.								
May 15	H	17	20	28.66	-4	58	58.4	E
19	H			28.57			59.2	E
June 9	C			28.56			59.2	W
10	C			28.72			59.4	W
11	C			28.51			59.1	W
July 10	C			28.58			59.0	E

221. 51 *Ophiuchi*.

1884.								
May 15	H	17	24	20.29	-23	52	18.1	E
19	H			20.26			17.3	E
June 9	C			20.24			18.2	W
10	C			20.32			17.4	W
11	C			20.25			18.4	W
1885.								
May 30	C			23.95			7.0	W

 β *Draconis*.*

1884.								
June 9	C	17	27	....	+52	23	15.2	W
10	C			48.73			15.8	W
11	C			48.73			15.2	W
July 10	C			48.70			15.8	E
1885.								
May 30	C			50.12			12.7	W
June 1	C			49.99			12.8	E
13	C			50.09			12.8	E
18	U			....			12.9	E
21	C			....			13.4	E
25	C			....			13.1	W
29	C			....			13.3	W
July 3	U			....			13.6	W
9	U			....			13.0	W
11	U			....			12.9	W
13	U			....			12.4	W
Aug. 17	H			49.99			....	E

B. A. C. 5950. pr.*

1885.							
June 10	U	17 29	.....	+55	15	47.9	E
13	U		.....			47.2	E
18	U		.....			48.0	E
21	C		.....			47.4	E
25	C		.....			47.5	W
29	C		.....			48.3	W
July 9	U		.....			48.1	W
11	U		.....			47.8	W
13	U		.....			47.8	W

 α Ophiuchi.*

1885.							
Aug. 17	H	17 29	35.81			....	E

 ν^3 Draconis.*

1885.							
May 30	C	17 30	.....	+55	15	5.9	W

222. 55. ξ Serpentis.*

1884.							
June 11	C	17 30	56.58	-15	19	27.2	W
July 9	C		56.64			28.2	E
10	C		56.73			28.0	E
13	C		56.69			27.2	W
1885.							
Aug. 17	H	31	0.09			....	E

223. 57 μ Ophiuchi.

1884.							
May 15	H	17 31	32.86	-8	2	49.0	E
19	H		32.47			49.4	E
June 9	C		32.35			50.2	W
10	C		32.46			49.4	W
1885.							
June 1	C		35.70			52.7	E

B. A. C. 5962.

1885.							
May 30	C	17 32	.....	+30	51	24.4	W
June 13	C		.....			22.0	E
21	C		.....			23.1	E
25	C		.....			23.5	W
29	C		.....			23.9	W
July 3	U		.....			23.7	W
9	U		.....			23.8	W
11	U		.....			23.2	W
13	U		.....			23.7	W

*f Draconis**, U. C.*f Draconis**, S. P.224. 56 *o Serpentis*.

1884.								
May 15	H	17	34	53.66	-12	48	43.9	E
19	H			53.82			42.8	E
June 9	C			53.74			45.5	W
10	C			53.76			44.4	W
1885.								
May 30	C			.....			46.1	W
June 1	C			57.09			45.2	E

*ι Herculis**=B. A. C., 5990.

1884.								
June 11	C	17	36	11.49	+46	4	6.2	W
July 9	C			11.39			6.1	E
10	C			11.45			7.0	E
13	C			11.40			6.1	W

B. A. C. 5990. = *ι Herculis*.*

1885.								
May 30	C	17	36	.....	+46	4	4.1	W
June 8	U			.....			4.7	E
10	U			.....			5.2	E
13	C			13.08			4.0	E
18	U			.....			4.1	E
21	C			.....			4.3	E
25	C			.....			4.9	W
29	C			.....			3.6	W
July 3	U			.....			4.8	W
9	U			.....			5.1	W
13	U			.....			4.3	W

1885. *ω Draconis*.*

Aug. 17	H	17	37	37.36	E
---------	---	----	----	-------	------	----	------	---

225. 60 *β Ophiuchi*.*

1884.								
May 15	H	17	37	44.54	+ 4	36	60.4	E
19	H			44.62			59.7	E
June 9	C			44.52			59.2	W
10	C			44.57			60.4	W
1885.								
May 30	C			47.50			58.2	W
June 13	C			47.53			57.5	

μ *Herculis*.*

1885.							
May 30	C	17 41	57.45	+27 47	19.0	W	
June 8	U		.....		18.2	E
10	U		.....		18.4	E
13	C		57.46		18.1	E	
18	U		.....		18.7	E
21	C		.....		18.0	E
25	C		.....		18.4	W
29	C		.....		18.6	W
July 8	U		.....		18.7	W
9	U		.....		18.2	W
11	U		.....		18.2	W
13	U		.....		18.4	W
Aug. 17	H		57.40		....	E

226. 62 γ *Ophiuchi*.*

1884.						
May 15	H	17 42	4.62	+ 2 45	6.2	E
19	H		4.61		7.5	E
June 9	C		4.63		6.4	W
10	C		4.65		7.2	W
11	C		4.54		6.4	W
July 13	C		4.55		7.5	W

 ψ *Draconis*,* U. C.

1884.						
June 10	C	17 43	60.00	+72 12	18.8	W
11	C		60.09		18.9	W
1885.						
May 30	C		59.33		18.0	W
June 13	C		59.38		18.4	E
21	C		....		17.4	E
25	C		.....		17.7	W
29	C		.....		16.4	W
Aug. 17	H		59.08		....	E

 ψ *Draconis*,* S. P.

1884.						
Nov. 7	H	17 43	60.20	+72 12	20.6	W

B. A. C. 6062.

1885.						
June 10	U	17 48	.....	+40 0	27.6	E
13	C		.....		26.9	E
18	U		.....		26.0	E
21	C		.....		26.7	E
25	C		.....		26.9	W
29	C		.....		28.4	W
July 3	U		.....		27.7	W
9	U		.....		27.4	W
11	U		.....		26.5	W
13	U		.....		28.2	W

227. μ 708.

1884.							
May 15	H	17 49	5.68	-18 46	49.3	E	
19	H		5.56		48.8	E	
June 9	C		5.59		50.6	W	
10	C		5.54		50.3	W	
11	C		5.57		50.2	W	
1885.							
May 30	C		9.10		51.0	W	

B. A. C. 6079 = ξ *Draconis*.*

1885.							
May 30	C	17 51	32.47	+56 53	27.4	W	
June 10	U		.....		27.9	E	
13	C		32.32		28.0	E	
18	U		.....		27.6	E	
21	C		.....		27.2	E	
25	C		.....		27.1	W	
29	C		.....		28.3	W	
July 3	U		.....		28.3	W	
9	U		.....		27.5	W	
11	U		.....		27.1	W	
13	U		.....		26.3	W	

228. μ 64 *Ophiuchi*.*

1884.							
May 15	H	17 52	38.46	- 9 45	28.6	E	
19	H		38.34		28.9	E	
June 9	C		38.50		30.6	W	
10	C		38.37		30.7	W	
11	C		38.41		....	W	
1885.							
Aug. 17	H		41.77		....	E	

B. A. C. 6084, = ξ *Herculis*.*

1885.							
May 30	C	17 53	17.75	+29 15	38.5	W	
June 10	U		.....		38.2	E	
13	C		17.78		37.5	E	
21	C		.....		38.7	E	
25	C		.....		38.2	W	
29	C		.....		38.6	W	
July 3	U		.....		38.3	W	
9	U		.....		38.1	W	
11	U		.....		38.2	W	
13	U		.....		38.4	W	

 γ *Draconis*.*

1884.							
July 9	C	17 53	54.75	+51 30	10.5	E	
10	C		54.71		10.4	E	
13	C		54.75		10.3	W	
1885.							
Aug. 16	H		56.07		....	E	

85 Draconis,* U. C.

1885. Aug. 17	H	17	54	35.51	E
------------------	---	----	----	-------	------	---

85 Draconis,* S. P.

1885. Feb. 20	H	17	54	35.73	+76 58	38.8	W
------------------	---	----	----	-------	--------	------	---

229. 67 Ophiuchi.*

1884. May 15	H	17	54	50.19	+ 2 56	17.5	E
19	H			50.09		17.7	E
June 9	C			50.15		17.2	W
10	C			50.13		17.4	W
11	C			50.12		16.9	W
1885. May 30	C			53.08		17.1	W

 γ Sagittarii.*

1884. June 9	C	17	58	21.39	-30 25	28.2	W
10	C			21.31		27.6	W
11	C			21.34		26.9	W
July 9	C			21.44		26.8	E
10	C			21.42		27.9	E
1885. May 30	C			25.16		26.1	W
June 10	U			.....		27.5	E
13	C			.....		28.5	E
18	U			.....		27.5	E
21	C			.....		27.6	E
25	C			.....		27.5	W
29	C			.....		27.9	W
July 3	U			.....		28.5	W
9	U			.....		28.2	W
11	U			.....		28.3	W
13	U			.....		27.3	W

 α Herculis.*

1885. Aug. 16	H	18	3	3.43	E
------------------	---	----	---	------	------	---

230. 13 μ Sagittarii.*

1884.								
May 15	H	18	6	49.47	—21	5	16.3	E
19	H			49.62			15.7	E
June 9	C			49.53			18.5	W
10	C			49.48			18.5	W
11	C			49.58			17.6	W
July 9	C			49.59			17.2	E
10	C			49.70			16.9	E
13	C			49.63			17.2	W
1885.								
Aug. 17	H			53.17			....	E

δ *Ursae Minoris*,* U. C.

1884.								
May 15	H	18	9	44.23	+86	36	....	E
19	H			44.88			....	E
June 9	C			43.87			....	W
10	C			44.97			....	W
11	C			44.51			..	W
July 18	C			43.65			....	W
1885.								
Aug. 17	H			24.43			....	E

 δ *Ursae Minoris*,* S. P.

1884.								
Nov. 7	H	18	9	43.76	+86	36	37.3	W
11	H			44.43			37.3	W
13	H			44.34			38.7	W
27	H			44.72			....	E
1885.								
Feb. 26	H			24.06			....	E

B. A. C. 6224.=36 *Draconis*,*

1885.								
May 30	C	18	13	14.19	+64	21	30.1	W
June 10	U			....			30.3	E
13	C			....			31.1	E
18	U			....			30.3	E
21	C			....			29.9	E
25	C			....			30.3	W
29	C			....			29.8	W
July 3	U			....			30.7	W
9	U			....			30.7	W
11	U			....			30.0	W
13	U			....			30.5	W

231. 58 η *Serpentis*,*

1884.								
May 15	H	18	15	18.55	- 2	55	40.8	E
19	H			18.43			40.0	E
June 9	C			18.50			41.4	W
10	C			18.50			41.9	W
1885.								
June 13	C			21.61			40.3	E

 ϵ *Sagittarii*.

1884.								
June 11	C	18	16	....	-34	26	17.0	W
July 9	C			....			16.9	E
10	C			....			16.9	E
13	C			....			17.1	W
1885.								
May 30	C			....			17.1	W
June 21	C			....			16.0	E
25	C			....			16.3	W
29	C			....			16.6	W

B. A. C. 6251 = 109 *Herculis*.*

1885.								
May 30	C	18	18	47.87	+21	43	5.1	W
June 8	U			.....			6.2	E
10	U			.....			4.3	E
13	C			47.86			5.8	E
18	U			.....			4.5	E
21	C			.....			5.0	E
25	C			.....			4.8	W
29	C			.....			4.4	W
July 3	U			.....			5.2	W
9	U			.....			5.0	W
11	U			.....			4.4	W
18	U			.....			4.5	W

b *Draconis*.*

1885.								
May 30	C	18	22	13.87	+58	44	4.0	W
June 10	U			.....			3.9	E
13	C			.....			3.8	E
18	C			.....			3.7	E
21	C			.....			3.4	E
25	C			.....			3.3	W
29	C			.....			3.6	W
July 3	U			.....			4.2	W
9	U			.....			3.9	W
11	U			.....			3.8	W
13	U			.....			3.4	W
Aug. 16	H			13.67			....	E

232. *Scuti* 2 *Hrv.*

1884.								
May 15	H	18	22	35.15	-14	38	18.8	E
19	H			35.10			18.7	E
June 9	C			35.14			19.2	W
16	C			35.02			19.2	W
11	C			35.05			19.1	W
July 13	C			35.22			19.0	W

233. BRADLEY 2329.

1884.								
May 15	H	18	38	35.53	-11	3	58.9	E
19	H			35.49			59.6	E
June 10	C			35.58 ₂₇			59.8	W
11	C			35.59			59.5	W
July 13	C			35.57			59.0	W
1885.								
June 13	C			38.94			56.9	E

234. BRADLEY 2332.

1884.								
May 15	H	18	31	27.38	-23	36	7.9	E
19	H			27.50			8.7	E
June 9	C			27.84			10.0	W
10	C			27.81			9.2	W
11	C			27.42			8.6	W
1885.								
May 30	C			30.96			6.4	W

α *Lyrae*.*

1885.							
Aug. 16	H	18 33	2.57	....		E	
235. <i>Scuti</i> , 5 Hev.							
1884.							
May 15	H	18 37	12.07	— 8 23	18.5	E	
19	H		12.21		19.1	E	
June 10	C		12.28		19.6	W	
11	C		12.29		19.3	W	
1885.							
May 30	C		15.42		16.7	W	
June 18	C		15.48		15.6	E	

110 *Herculis*.*

1885.							
June 21	C	18 40	.....	+20 26	12.9	E	
25	C		.....		13.1	W	
29	C		.....		12.9	W	
July 3	U		.....		13.0	W	
9	U		.....		12.8	W	
18	U		.....		12.5	W	
Aug. 16	H		42.78		....	E	

236. *Scuti* 6 Hev.

1884.							
May 15	H	18 41	1.12	— 4 53	14.7	E	
19	H		1.24		15.9	E	
June 10	C		1.22		15.7	W	
11	C		1.17		14.7	W	
1885.							
May 30	C		4.30		12.0	W	
June 18	C		4.35		10.7	E	

237. 30 *Sagittarii*.

1884.							
May 15	H	18 43	52.02	—22 17	35.5	E	
19	H		52.09		37.5	E	
June 10	C		52.09		38.3	W	
11	C		52.12		36.2	W	
1885.							
May 30	C		55.63		34.7	W	
June 13	C		55.80		32.4	E	
29	C		.....		33.1	W	

 β *Lyrae*.*

1885.							
May 30	C	18 45	50.09	+33 13	45.6	W	
June 8	U		.....		46.3	E	
10	U		.....		46.3	E	
13	C		50.06		46.8	E	
18	C		.....		46.6	E	
July 3	U		.....		46.3	W	
9	U		.....		46.4	W	
11	U		.....		46.5	W	
13	U		.....		46.8	W	

*o Draconis.**

1885.							
Aug. 16	H	18	49	30.14	....		E

238. 63 *♂ Serpentis pr.**

1884.							
May 15	H	18	50	27.16	+ 4 3	13.0	E
19	H			27.20		12.4	E
June 10	C			27.30		14.0	W
11	C			27.17		13.4	W
July 13	C			27.15		13.7	W
1885.							
May 30	C			30.14		16.3	W
June 10	U			.....		17.2	E
13	C			30.14		17.3	E
18	U			.....		16.8	E
21	C			.....		17.7	E
25	C			.....		17.5	W
29	C			.....		17.8	W
July 3	U			.....		17.2	W
9	U			.....		17.6	W
11	U			.....		17.5	W
13	U			.....		17.5	W

*R Lyrae.**

1885.							
Aug. 16	H	18	51	50.14	....		E

*γ Lyrae.**

1885.							
Aug. 18	H	18	54	38.51	....		E

B. A. C. 6476.

1885.							
June 8	U	18	54	.....	+57 39	44.8	E
10	U			.....		44.6	E
18	U			.....		45.8	E
21	C			.....		45.4	E
25	C			.....		46.1	W
29	C			.....		46.1	W
July 3	U			.....		45.5	W
9	U			.....		45.9	W
11	U			.....		45.8	W
13	U			.....		45.4	W

239. P. XVIII^b 260.

1884.							
May 15	H	18	54	55.68	-15 26	40.7	E
19	H			55.88		42.4	E
June 10	C			55.81		43.5	W
11	C			55.75		42.2	W
1885.							
May 30	C			59.18		38.9	W
June 13	C			59.21		40.1	E

ζ *Sagittarii*.240. 16 λ *Aquilae*.*

1884.								
May 15	H	19	0	5.55	— 5	3	19.5	E
19	H			5.58			20.0	E
June 10	C			5.52 xx			19.2	W
11	C			5.59			20.2	W
July 20	C			5.66			19.5	W
1885.								
May 30	C			8.74			15.3	W
June 13	C			8.77			13.7	E
21	C			...			14.7	E
25	C			...			15.1	W
29	C			...			15.4	W
July 3	U			...			15.5	W
11	U			...			14.7	W

 ζ *Aquilae*.*

1885.								
Aug. 16	H	19	0	7.55			....	E
18	H			7.44			....	E

B. A. C. 6547.

1885.								
May 30	C	19	2	....	+28	26	53.6	W
June 8	U			....			53.0	E
10	U			....			53.3	E
13	C			....			54.0	E
18	U			....			54.1	E
21	C			....			53.6	E
25	C			....			54.8	W
29	C			....			53.9	W
July 3	U			....			54.0	W
9	U			....			54.7	W
11	U			....			54.4	W
13	U			....			54.5	W

241. 41 π *Sagittarii*.*

1884.								
May 15	H	19	2	51.87	—21	12	24.2	E
19	H			51.82			25.6	E
June 10	C			51.93			25.2	W
11	C			51.87			25.1	W
July 9	C			51.92			24.9	E
10	C			51.94			26.1	E
20	C			51.93			25.3	W
1885.								
Aug. 16	H			55.63			....	E
18	H			55.52			....	E

242. 20 *Aquilae*.

1884.								
May 15	H	19	6	23.12	-8	7	55.7	E
19	H			23.26			57.4	E
June 10	C			23.18			57.8	W
11	C			23.22			56.9	W
July 9	C			23.25			57.8	E
10	C			23.16			57.9	E
20	C			23.20			56.8	W

243. 43 d *Sagittarii*.

1884.								
June 21	C	19	10	50.86	-19	9	27.8	E
July 9	C			50.91			30.4	E
10	C			50.85			31.0	E
18	C			50.85			28.3	W
20	C			50.88			30.4	W
1885.								
May 30	C			54.31			25.0	W

♂ *Lyrae*.*

1885.								
Aug. 16	H	19	12	22.62			....	E

♂ *Draconis*,* U. C.

1884.								
June 21	C	19	12	31.50	+67	27	....	E
July 18	C			31.68			....	W
1885.								
Aug. 18	H			31.50			....	E
26	H			31.60			....	E
30	H			31.56			....	E

♂ *Draconis*,* S. P.κ *Cygni*.*

1885.								
June 18	U	19	14	....	+53	9	24.4	E
Aug. 16	H			26.63			....	E
18	H			26.63			....	E
26	H			26.75			....	E
30	H			26.67			...	E

244. 46 v *Sagittarii*.

1884.								
June 21	C	19	15	5.04	-16	10	16.7	E
July 9	C			5.06			18.4	E
10	C			4.99			19.0	E
18	C			4.96			17.4	W
20	C			5.07			18.3	W
1885.								
May 30	C			8.45			12.2	W

WASHBURN OBSERVATORY.

161.

τ Draconis.*

1884.							
June 21	C	19	17	46.68	+73	8	24.5 E
July 18	C			46.82			23.3 W
20	C			46.57			23.4 W
31	C			46.64			22.8 W
1885.							
Aug. 18	H			45.52			.... E
26	H			45.58			.... E
30	H			45.62			.... E

245. 30 δ Aquilae.*

1884.							
July 9	C	19	19	39.08	+ 2	53	4.1 E
10	C			39.99			2.3 E
18	C			39.05			3.0 W
20	C			38.88			4.1 W
1885.							
May 30	C			42.07			9.9 W
Aug. 18	H			42.03			.... E
26	H			42.00			.... E
30	H			42.02			.... E

B. A. C. 6651.

[This star of the latitude list has been observed at the Harvard College Observatory, by Professor W. A. ROGERS, at our request. The resulting places are strictly comparable with our own and are given below.]

1885.							
July 21		19	19	58.40	+36	13	30.3
22				58.46			30.6
23				58.47			30.6
25				58.44			30.5
27				58.50			29.5
28				58.39			29.5
Aug. 4				58.45			30.6
6				....			29.7
8				58.58			29.3
9				58.54			29.6
11				58.44			30.0
15				58.39			29.6
16				58.46			30.3
20				58.48			29.7

B. A. C. 6659.

1885.							
June 8	U	19	20	....	+50	2	48.8 E
10	U			....			49.0 E
13	C			....			47.8 E
18	U			....			48.8 E
21	C			....			48.6 E
25	C			....			48.6 W
29	C			....			47.7 W
July 9	U			....			48.7 W
11	U			....			49.4 W

B. A. C. 6659 seq.

1885.							
June 18	U	19	21	....	+50	0	54.0 E
July 13	U			....			54.3 W

246. 36 *e Aquilæ.*

1884.								
June 21	C	19	24	35.87	-3	1	46.0	E
25	C			35.77			....	E
July 9	C			35.91			48.1	E
10	C			35.84			48.3	E
20	C			35.79			47.3	W
31	C			35.82			46.7	W

B. A. C. 6687.

1885.								
May 30	C	19	24	....	+52	5	10.7	W
June 8	U			....			12.1	E
10	U			....			11.5	E
13	C			....			11.9	E
18	U			....			12.0	E
21	C			....			12.8	E
25	C			....			11.3	W
29	C			....			11.4	W
July 9	U			....			11.4	W
11	U			....			11.7	W
13	U			....			11.9	W

 β *Cygni*.*

1885.								
Aug. 26	H	19	26	4.98			....	E

 ι *Cygni*.*

1884.								
June 21	C	19	26	46.93	+51	28	59.0	E
25	C			46.89			...	E
July 9	C			46.92			58.4	E
10	C			46.86			59.1	E
18	C			46.85			57.9	W
20	C			46.82			58.3	W
31	C			46.86			59.3	W
1885.								
Aug. 18	H			48.49			....	E
30	H			48.33			....	E

B. A. C. 6698.

1885.								
May 30	C	19	27	....	+34	12	31.4	W
June 8	U			....			31.1	E
13	C			....			31.6	E
18	U			....			32.4	E
21	C			....			31.9	E
25	C			....			31.7	W
29	C			....			31.3	W
July 9	U			....			31.8	W
11	U			....			31.4	W
13	U			....			31.7	W

247. 52 *h Sagittarii*.*

1884.								
June 21	C	19	29	38.84	-25	8	16.8	E
25	C			38.82			....	E
July 9	C			38.95			18.1	E
20	C			38.86			19.4	W
31	C			38.88			18.2	W
Sept. 11	C			38.82			19.6	W
1885.								
Aug. 18	H			42.50			....	E
26	H			42.54			....	E
30	H			42.50			....	E

248. 39 κ *Aquilae*.

1884.						
July 10	C	19 30	39.00	— 7 17	5.5	E
12	C		[38.91: α]		4.7	E
Sept. 8	C		39.12		4.6	W
9	C		39.05		4.3	W
1885.						
May 30	C		42.20	16	57.6	W
June 18	C		42.32		57.6	E

S *Cygni*.*

1884.						
June 21	C	19 33	20.04	+49 57	10.4	E
25	C		19.73		....	E
July 9	C		19.79		10.5	E
10	C		19.80		10.5	E
18	C		19.87		10.6	W
20	C		19.82		9.5	W
31	C		19.85		10.5	W
Sept. 11	C		19.93		10.1	W
1885.						
May 30	C		.....		18.7	W
June 10	U		.....		18.9	E
18	C		21.44		18.2	E
21	C		.....		18.1	E
25	C		.....		19.1	W
29	C		.....		19.2	W
July 9	U		.....		19.0	W
11	U		.....		19.4	W
Aug. 18	H		21.46		....	E
26	H		21.46		....	E

B. A. C. 6741.

1885.						
May 30	C	19 34	.....	+49 1	6.8	W
June 8	U		.....		6.0	E
10	U		.....		6.1	E
13	C		.....		6.3	E
18	U		.....		6.9	E
21	C		.....		7.0	E
25	C		.....		6.5	W
29	C		.....		7.1	W
July 9	U		.....		6.3	W
11	U		.....		5.9	W
13	U		.....		6.7	W

249. 56 f *Sagittarii*.

1884.						
June 21	C	19 39	35.78	—20 2	18.2	E
25	C		35.80		....	E
July 10	C		35.66		20.4	E
20	C		35.76		21.8	W
31	C		35.70		21.7	W
1885.						
May 30	C		39.16		12.1	W

λ *Ursae Minoris*,* U. C.

1884.								
July 9	C	19	39	59.85	+88	57	10.3	E
12	C			59.21			9.5	E
1885.								
Aug. 18	H		38	55.91			....	E

 λ *Ursae Minoris*,* S. P.

1885.								
Feb. 20	H	19	38	54.96	+88	57	....	W
26	H			55.75			....	E
Mar. 21	H			55.62			....	W

B. A. C. 6771=15 *Cygni*,*

1885.								
June 8	U	19	40	....	+87	4	36.4	E
10	U			....			36.7	E
13	C			....			36.6	E
18	U			....			37.1	E
21	C			....			36.8	E
25	C			....			36.8	W
29	C			....			37.0	W
July 9	U			....			35.7	W
11	U			....			36.2	W
13	U			....			36.5	W

 γ *Aquilae*,*

1884.								
July 18	C	19	40	44.64	+10	19	53.5	W
1885.								
Aug. 30	H			47.57			....	E

 δ *Cygni*,*

1885.								
Aug. 30	H	19	41	23.84			....	E

B. A. C. 6784.¹

1885.								
May 30	C	19	42	....	+83	27	37.1	W
June 10	U			....			37.0	E
13	C			....			37.4	E
18	U			....			37.0	E
21	C			....			36.9	E
25	C			....			37.9	W
29	C			....			37.8	W
July 9	U			....			36.9	W
11	U			....			37.1	W
13	U			....			37.6	W

¹See A. N. 2260,'55, No. 41.

*δ Sagittae.**

1884. July 18	C	19 42	12.82	+18 14	56.7	W
1885. Aug. 18	H		15.63		....	E
26	H		15.59		....	E
30	H		15.60		....	E

LL 37687.

1884. June 21	C	19 43	27.87	-11 0	52.1	E
------------------	---	-------	-------	-------	------	---

250. 51 *Aquilae*.

1884. June 25	C	19 44	23.84	-11 3	....	E
July 10	C		23.82		25.7	E
20	C		23.92		25.4	W
31	C		23.79		24.4	W
1885. May 30	C		27.16		16.8	W
June 13	C		27.10		17.0	E

*α Aquilae.**

1884. July 18	C	19 45	7.48	+ 8 33	46.6	W
1885. Aug. 18	H		10.32		....	E
26	H		10.37		....	E
30	H		10.34		....	E

251. 55 *η Aquilae.**

1884. June 21	C	19 46	33.87	+ 0 42	30.8	E
25	C		33.80		....	E
July 10	C		33.76		31.0	E
20	C		33.86		31.5	W
31	C		33.80		30.7	W
1885. May 30	C		36.92		40.4	W

B. A. C. 6824.

1885. May 30	C	19 47	....	+52 41	47.6	W
June 8	U		....		46.7	E
10	U		....		47.9	E
13	C		....		47.1	E
18	U		....		47.7	E
21	C		....		47.6	E
25	C		....		47.4	W
29	C		....		47.6	W
July 9	U		....		47.8	W
11	U		....		47.5	W
13	U		....		47.5	W

ϵ *Draconis*.*

1884.						
June 21	C	19 48	33.73	+69 58	20.8	E
July 10	C		33.62		20.9	E
18	C		33.63		20.4	W
20	C		23.65		21.4	W
31	C		33.65		20.4	W
Sept. 8	C		33.79		....	W
9	C		33.70		21.3	W
1885.						
Aug. 26	H		33.50		....	E
30	H		33.68		....	E

 β *Aquilae*.*

1885.						
Aug. 30	H	19 49	39.92		....	E

 ψ *Cygni*.*

1885.						
May 30	C	19 52	.....	+52 8	1.9	W
June 8	U		.....		2.6	E
10	U		.....		2.5	E
13	C		39.34		2.0	E
18	U		.....		2.2	E
21	C		.....		2.5	E
25	C		.....		2.3	W
29	C		.....		2.2	W
July 9	U		.....		2.5	W
11	U		.....		2.4	W
Aug. 26	H		39.32		...	E
30	H		39.38		...	E

 γ *Sagittae*.*

1884.						
July 18	C	19 53	35.96	+19 10	40.1	W
1885.						
Aug. 26	H		38.52		....	E
30	H		38.58		....	E

252. 63 *Sagittarii*.

1884.						
June 21	C	19 55	28.76	-13 57	26.7	E
25	C		28.66		....	E
July 31	C		28.71		26.3	W
Sept. 8	C		28.72		23.4	W
9	C		28.72		27.1	W
1885.						
May 30	C		32.03		17.8	W

c *Sagittarii*.

1884.							
July 20	C	19 55	.....	-28	1	51.6	W
Sept. 11	C		.....			51.7	W
1885.							
June 13	C		.....			[33.1]	E
21	C		.....			42.6	E
25	C		.....			42.5	W
29	C		.....			42.6	W
July 9	U		.....			42.6	W
11	U		.....			44.3	W
13	U		.....			42.6	W

253. M. 811.

1884.							
June 21	C	19 56	.....	-22	55	12.3	E
July 10	C		51.80			12.4	E
12	C		51.73			12.8	E
20	C		51.78			11.8	W
31	C		51.82			11.8	W
1885.							
May 30	C		55.30			....	W

B. A. C. 6895.

1885.							
May 30	C	19 58	.....	+49	47	5.3	W
June 8	U		.....			5.3	E
10	U		.....			5.4	E
13	U		.....			4.4	E
18	U		.....			5.8	E
21	C		.....			6.1	E
25	C		.....			6.4	W
29	C		.....			5.4	W
July 9	U		.....			5.6	W
11	U		.....			6.2	W
13	U		.....			6.9	W

254. Ll. 38458.

1884.							
June 21	C	20 1	54.98	-7	5	46.4	E
25	C		54.98			....	E
July 10	C		54.92			45.7	E
12	C		54.86			46.0	E
20	C		54.90			44.6	W
31	C		54.83			44.5	W
Sept. 11	C		54.89			46.0	W

B. A. C. 6937.

1885.							
May 30	C	20 5	.....	+36	30	5.2	W
June 8	U		.....			4.9	E
10	U		.....			4.9	E
13	U		.....			4.6	E
18	U		.....			4.9	E
21	C		.....			4.8	E
25	C		.....			5.3	W
29	C		.....			5.3	W
July 9	U		.....			5.0	W
13	U		.....			4.9	W

255. 65 γ *Aquilae*.*

1884.								
June 21	C	20	5	19.20	- 1	9	53.9	E
25	C			19.26			....	E
July 10	C			19.15			53.7	E
13	C			19.11			53.1	E
18	C			19.12			53.8	W
20	C			19.17			52.5	W
31	C			19.09			50.6	W
Sept. 11	C			19.19			52.9	W
1885.								
Aug. 21	H			22.29			....	E
25	H			22.43			....	E

 α^1 *Cygni* seq.*

1884.								
June 21	C	20	9	58.73	+46	23	23.7	E
25	C			58.83			....	E
July 19	C			58.71			23.2	W
20	C			58.72			23.0	W
31	C			58.78			23.2	W
1885.								
May 30	C			60.72			34.6	W
June 13	C			.....			34.4	E
18	U			.....			34.4	E
21	C			.....			34.4	E
25	C			.....			34.3	W
29	C			.....			35.0	W
July 13	U			.....			34.6	W
Aug. 10	H			60.61			34.1	E
13	H			60.57			34.4	E
14	H			60.53			34.3	E
15	H			60.65			34.0	E
21	H			60.51			....	E
25	H			60.53			....	E
Sept. 1	H			60.62			....	E

256. 4 *Capricorni*.

1884.								
July 10	C	20	11	12.54	-22	10	2.5	E
12	C			.....			2.3	E
Sept. 8	C			12.47			2.3	W
11	C			12.44			2.6	W
1885.								
May 30	C			15.92		9	51.6	W
June 13	C			16.10			51.0	E

257. 6 α^2 *Capricorni*.*

1884.								
June 21	C	20	11	37.12	-12	54	13.2	E
25	C			37.04			....	E
July 20	C			37.02			....	W
31	C			37.06			....	W
Sept. 9	C			37.09			12.3	W
1885.								
Aug. 10	H			40.49			....	E
13	H			40.40			....	E
14	H			40.54			2.0	E
15	H			40.39			1.7	E
21	H			40.47			....	E
25	H			40.45			....	E
Sept. 5	H			40.44			....	E

B. A. C. 6988.

1885.								
June 8	U	20	11	.....	+47	21	40.7	E
10	U			.....			41.3	E
18	U			.....			41.6	E
21	C			.....			40.2	E
25	C			.....			41.3	W
29	C			.....			41.1	W
July 9	U			.....			40.4	W
13	U			.....			40.6	W
14	U			.....			41.5	W
15	U			.....			42.0	W

 κ Cephei,* U. C.

1885.								
Aug. 21	H	20	12	44.65	+77	21	.....	E
Sept. 1	H			44.64			.....	E
5	H			44.68			.....	E

 κ Cephei,* S. P.

1885.								
April 5	H	20	12	44.64			.....	W

258. 9 β Capricorni*

1884.								
June 21	C	20	14	29.63	-15	8	48.3	E
25	C			29.63			.....	E
July 12	C			29.54			48.8	E
20	C			29.62			48.4	W
31	C			29.65			47.9	W
Sept. 11	C			29.56			48.5	W

B. A. C. 7002.

1885.								
May 30	C	20	16	.....	+39	2	27.4	W
June 8	U			.....			26.9	E
10	U			.....			27.3	E
13	C			.....			26.5	E
18	U			.....			26.0	E
21	C			.....			26.9	E
29	C			.....			27.4	W
July 9	U			.....			27.2	W
13	U			.....			26.6	W
14	U			.....			27.4	W
15	U			.....			27.0	W

*γ Cygni.**

1885.							
May 30	C	20 18	6.14	+39 53	20.2	W	
June 13	C		6.06		20.6	E	
21	C		5.90		20.1	E	
25	C		6.09		20.3	W	
29	C		6.04		20.7	W	
July 9	U		....		19.7	W
15	U		6.07		19.9	W	
Aug. 10	H		6.01		19.2	E	
21	H		5.99		....	E
25	H		5.97		....	E
Sept. 1	H		5.98		....	E
5	H		5.97		....	E

239. 11 ρ Capricorni.*

1884.						
June 21	C	20 22	14.60	-18 11	46.7	E
25	C		14.62		....	E
July 12	C		14.59		46.5	E
20	C		14.61		47.1	W
31	C		14.68		47.0	W
Sept. 8	C		14.62		47.1	W
9	C		14.64		46.4	W
11	C		14.53		47.0	W

B. A. C. 7067.

1885.						
May 30	C	20 24	....	+29 59	5.9	W
June 8	U		....		6.8	E
10	U		....		6.3	E
13	C		....		7.3	E
18	U		....		6.4	E
21	C		....		6.3	E
25	C		....		7.3	W
29	C		....		7.3	W
July 9	U		....		7.0	W
13	U		....		6.5	W

260. M. 842.

1884.						
June 21	C	20 26	2.93	-10 14	55.2	E
25	C		2.97		....	E
July 12	C		2.87		53.9	E
20	C		2.86		53.5	W
31	C		2.96		53.8	W
Sept. 11	C		2.86		54.6	W

δ Cephei.*

1885.								
July 14	U	20	27	38.99	+62	36	27.7	W
15	U			39.02			28.8	W
Aug. 10	H			38.92			27.4	E
13	H			38.90			28.0	E
14	H			39.01			27.6	E
15	H			39.02			28.2	E
21	H			39.01			....	E
25	H			38.91			....	E

 ε Delphini.*

1884.								
Sept. 8	C	20	27	40.20	+10	54	34.5	W
1885.								
Sept. 1	H			43.13			....	E
5	H			43.16			....	E

B. A. C. 7105.

1885.								
May 30	C	20	28	....	+56	23	21.5	W
June 8	U			....			21.7	E
10	U			....			21.4	E
13	C			....			21.9	E
18	U			....			21.8	E
21	C			....			21.4	E
25	C			....			22.0	W
29	C			....			22.4	W
July 9	U			....			22.0	W
13	U			....			21.4	W

 γ 70 Aquilae.

1884.								
June 21	C	20	30	41.11	— 2	57	4.6	E
25	C			41.11			...	E
July 12	C			41.14			3.8	E
20	C			41.22			3.7	W
31	C			41.22			4.7	W
Sept. 11	C			41.21			6.0	W

73 Draconis,* U. C.

1885.								
Sept. 1	H	20	33	0.90	+ 74	33	....	E
5	H			0.76			....	E

73 Draconis,* S. P.

1885.								
April 3	H	20	33	0.89	+74	33	37.6	E
5	H			0.85			....	W

262. 15 *v* Capricorni.*

1884.						
June 21	C	20 33	26.73	—18 32	46.3	E
25	C		26.83		....	E
July 12	C		26.75		46.7	E
20	C		26.70		46.9	W
31	C		26.75		46.2	W
1885.						
May 30	C		30.11		33.5	W
June 10	U		.....		33.6	E
13	C		30.36		33.1	E
18	U		.....		34.1	E
21	C		30.29		33.9	E
25	C		30.15		33.6	W
29	C		30.19		34.4	W
July 9	U		.....		34.5	W
13	U		.....		34.7	W
14	U		30.16		34.6	W
15	U		30.18		34.4	W
Aug. 10	H		30.21		34.2	E
13	H		30.25		33.6	E
14	H		30.25		34.4	E
15	H		30.20		33.7	E
21	H		30.23		....	E
25	H		30.24		....	E

 α Delphini.*

1885.						
Sept. 1	H	20 34	17.88		....	E
5	H		17.82		....	E

 α Cygni.*

1884.						
June 21	C	20 37	28.56	+44 51	57.8	E
25	C		28.51		....	E
July 12	C		28.44		58.2	E
20	C		28.72		58.0	W
31	C		28.59		58.8	W
Sept. 8	C		28.66		58.0	W
9	C		28.65		58.1	W
1885.						
May 30	C		30.73	52	10.4	W
June 8	U		.....		11.4	E
10	U		.....		10.5	E
13	C		30.83		11.0	E
18	U		.....		[12.2]	E
21	C		[30.73]		11.1	E
25	C		30.76		10.9	W
29	C		30.77		11.4	W
July 9	U		.....		11.7	W
13	U		.....		11.7	..
14	U		30.72		11.2	W
15	U		30.72		11.2	W
Aug. 10	H		30.58		11.4	E
13	H		30.57		10.8	E
14	H		30.57		11.0	E
15	H		30.65		11.2	E
21	H		30.60		....	E
Sept. 1	H		30.64		....	E
5	H		30.66		....	E

263. 2 ϵ Aquarii.*

1884.							
June 21	C	20 41	23.80	— 9 55	11.7	E	
25	C		23.73		....	E
July 12	C		23.79		10.0	E	
20	C		23.84		10.9	W	
31	C		23.72		12.2	W	
Sept. 11	C		23.76		11.9	W	
1885.							
Sept. 1	H		27.09		....	E
5	H		26.97		....	E

 λ Cygni.*

1885.						
Sept. 1	H	20 42	55.80		....	E
5	H		55.74		....	E

 η Cephei,* U. C. η Cephei,* S. P.

AUWERS 15.

1885.						
May 30	C	20 43	1.23	+52 34	37.0	W
June 13	C		1.13		37.6	E
21	C		[1.10]		37.0	E
25	C		1.15		37.6	W
29	C		1.23		38.1	W
July 14	U		1.13		37.2	W
15	U		1.15		36.8	W
Aug. 10	H		1.09		38.1	E
13	H		1.03		37.9	E
14	H		1.05		37.5	E
21	H		1.12		....	E
25	H		1.10		....	E

AUWERS 16.

1885.						
May 30	C	20 44	26.85	+51 59	16.0	W
June 13	C		26.88		16.8	E
25	C		26.81		16.0	W
29	C		26.95		16.2	W
Aug. 15	H		26.77		17.0	E
25	H		26.74		....	E

 ω Capricorni.

1884.						
June 21	C	20 44	....	—27 21	7.3	E
25	C		....		...	E
July 12	C		....		7.6	E
20	C		....		8.3	W
Sept. 8	C		....		8.5	W
9	C		....		8.6	W

AUWERS 19.

1885.							
May 30	C	20 46	0.26	+49 41	54.8	W	
June 13	C		0.11		55.9	E	
21	C		[0.06]		54.9	E	
25	C		0.17		55.7	W	
29	C		0.14		56.2	W	
July 14	U		0.20		55.9	W	
15	U		0.19		55.2	W	
Aug. 10	H		0.09		55.6	E	
13	H		0.16		55.7	E	
14	H		0.11		55.8	E	
15	H		0.18		55.9	E	
21	H		0.16		....	E
25	H		0.08		....	E

264. 19 *Capricorni*.

1884.						
June 21	C	20 48	14.55	-18 21	44.5	E
25	C		14.59		....	E
July 13	C		14.51		43.6	E
20	C		14.55		44.1	W
31	C		14.58		43.6	W
1885.						
May 30	C		17.89		29.9	W

32 *Vulpeculae*.*

1885.						
Sept. 1	H	20 49	39.57		....	E
5	H		39.52		....	E

76 *Draconis*,* U. C.

1884.						
June 1	C	20 50	54.07	+82 6	1.9	E
25	C		54.02		....	E
July 12	C		53.95		1.7	E
20	C		54.27		3.0	W
31	C		53.74		2.1	W
Sept. 8	C		53.91		2.6	W
9	C		53.95		2.9	W
11	C		53.97		2.4	W
1885.						
May 30	C		51.60		15.8	W
June 13	C		51.85		16.2	E
21	C		[51.17]		14.8	E
25	C		51.16		16.5	W
29	C		51.07		16.6	W
July 14	U		50.68		16.6	W
15	U		51.05		16.0	W
Aug. 10	H		50.94		16.0	E
13	H		50.99		16.7	E
14	H		50.94		15.8	E
21	H		51.00		....	E
25	H		51.11		....	E
Sept. 1	H		51.04		....	E
5	H		51.33		....	E

76 *Draconis*,* S. P.

1885.							
Mar. 7	C	20	56	[51.02]	+82	6	[15.2] E
9	C			51.03			16.6 E
10	C			51.05			16.7 E
11	C			51.01			18.1 E
16	C			51.09			16.0 W
19	C			51.07			16.1 W
20	C			51.18			15.7 W
21	H			51.25			16.0 W
22	C			51.09			16.2 W
24	C			50.96			16.8 E
28	H			51.37			.... E
April 3	H			50.85			.... E
4	H			50.48			.... E
5	H			50.90			.... W
13	H			51.36			.... W

v Cygni,*

1885.							
Sept. 1	H	20	52	53.16		...	E

265. 11 *Aquarii*.

1884.							
June 21	C	20	54	27.38	— 5	10	40.4 E
25	C			27.32			.... E
July 12	C			27.34			38.8 E
20	C			27.39			39.6 W
31	C			27.28			40.0 W
Sept. 11	C			27.35			40.5 W

61 *Cygni*,*

1885.							
Sept. 5	H	21	1	44.56		....	E

266. 13 *v Aquarii*,*

1884.							
June 21	C	21	3	16.55	—11	50	27.0 E
25	C			16.50			.... E
July 12	C			16.52			25.9 E
20	C			16.55			26.9 W
31	C			16.54			26.4 W
Sept. 8	C			16.52			27.2 W
9	C			16.55			27.4 W
11	C			16.46			27.7 W
1885.							
May 30	C			19.66			12.2 W
June 21	C			[19.93]			12.3 E
25	C			19.74			12.6 W
29	C			19.74			10.7 W
July 14	U			19.75			.... W
15	U			19.83			12.4 W
Aug. 10	H			19.81			11.9 E
13	H			19.80			12.9 E
14	H			19.77			12.1 E
15	H			19.79			12.9 E
21	H			19.80			.... E
25	H			19.76			.... E
Sept. 5	H			19.86			.... E

BR. 2777.*

1884.									
June	21	C	21	7	47.93	+77	39	19.9	E
	25	C			47.93			....	E
July	12	C			47.95			19.5	E
	20	C			48.04			20.3	W
	31	C			47.97			18.8	W
1885.									
Aug.	15	H			46.84			34.6	E

 ζ Cygni.*

1885.									
May	30	C	21	8	2.54	+29	45	20.2	W
June	13	C			2.53			19.8	E
	21	C			2.41			19.9	E
	25	C			2.52			19.9	W
	29	C			2.49			19.3	W
July	15	U			2.58			19.5	W
	15	U			2.54			19.7	W
Aug.	10	H			2.55			20.5	E
	13	H			2.53			18.8	E
	14	H			2.50			20.0	E
	21	H			2.55			....	E
	25	H			2.50			....	E

267. 8 α Equulei.*

1884.									
June	21	C	21	10	1.52	+ 4	46	7.0	E
	25	C			1.60			....	E
July	12	C			1.49			7.5	E
	20	C			1.53			....	W
Sept.	8	C			1.48			7.9	W
	9	C			1.52			7.8	W
	11	C			1.51			8.2	W
1885.									
Aug.	10	H			4.53			22.4	E
	13	H			4.58			22.0	E
	14	H			4.55			22.2	E
	15	H			4.52			21.9	E
	21	H			4.61			....	E
	25	H			4.50			....	E

268. 16 Aquarii.

1884.										
June	21	C	20	14	59.42	—	5	3	7.5	E
	25	C			59.46				...	E
July	12	C			59.31				7.0	E
	20	C			59.42				6.9	W
	31	C			59.34				7.0	W
Sept.	8	C			59.41				6.9	W
	9	C			59.41				5.9	W

 α Cephei.*

1885.									
July 14	U	21	15	.....	+62	5	54.4	W	
Aug. 15	H			50.02			54.5	E	

269. 34 ζ *Capricorni*.*

1884.								
June 21	C	21	20	2.58	—22	54	46.7	E
25	C			2.63			....	E
July 12	C			2.67			47.4	E
20	C			2.60			48.0	W
31	C			2.58			46.4	W
Sept. 8	C			2.62			47.0	W
9	C			2.55			47.2	W
1885.								
Aug. 15	H			6.11			33.1	W

270. 22 β *Aquarii*.*

1884.								
June 21	C	21	25	27.06	— 6	4	51.4	E
25	C			27.19			....	E
July 12	C			27.14			51.9	E
20	C			27.07			....	W
30	C			27.15			52.3	W
31	C			27.16			51.0	W
Sept. 8	C			27.08			51.4	W
9	C			27.12			51.8	W

 β *Cephei*.*

1884.								
July 20	C	21	27	9.59	+70	3	5.2	W
Sept. 11	C			9.56			5.0	W

271. 39 ε *Capricorni*.

1884.								
June 21	C	21	30	35.08	—19	59	7.1	E
25	C			35.13			....	E
July 12	C			35.02			6.5	E
20	C			35.11			7.8	W
30	C			35.02			7.6	W
31	C			35.15			7.2	W

272. 40 γ *Capricorni*.*

1884.								
June 21	C	21	33	....	—17	11	8.9	E
25	C			39.71			....	E
July 12	C			39.81			9.2	E
20	C			39.76			....	W
30	C			39.80			9.0	W
31	C			39.85			8.5	W
Sept. 8	C			39.79			7.8	W
9	C			39.79			9.7	W
11	C			39.84			8.7	W

 ι *Piscis australis*.

1884.								
June 21	C	21	38	....	—33	33	16.1	E
July 12	C			....			16.5	E
19	C			....			17.7	W
30	C			....			16.5	W
31	C			....			15.9	W

ϵ Pegasi.*

1885. Aug. 18	H	21	38	32.32	E
------------------	---	----	----	-------	------	---

273. 48 λ Capricorni.*

1884. June 21	C	21	40	17.40	-11 54	1.6	E
25	C			17.44		...	E
July 12	C			17.46		1.1	E
19	C			17.38		1.7	W
30	C			17.43		0.1	W
Sept. 11	C			17.39		0.9	W

 δ Capricorni.*

1885. Aug. 18	H	21	40	41.63	E
------------------	---	----	----	-------	------	---

 π^2 Cygni.*

1884. June 21	C	21	42	30.40	+48 46	22.8	E
21	C			30.58		....	E
July 12	C			30.45		23.2	E
19	C			30.54		22.8	W
30	C			30.52		23.1	W
31	C			30.58		21.7	W
1885. Aug. 18	H			32.60		....	E
Sept. 13	H			32.68		39.7	E
14	H			32.68		40.0	E

274. P. XXI^h 320.

1884. June 21	C	21	48	6.93	- 4 49	11.1	E
25	C			6.84		....	E
July 12	C			6.81		11.2	E
19	C			6.90		10.3	W
30	C			6.82		11.1	W
Sept. 11	C			6.83		10.6	W

275. M. 909.

1884. June 21	C	21	52	15.59	-21 44	9.5	E
25	C			15.57		...	E
July 12	C			15.48		8.9	E
19	C			15.57		9.3	W
30	C			15.62 _{xx}		8.7	W
Sept. 11	C			15.53		9.5	W

 η Piscis australis.

1884. June 21	C	21	54	....	-29 0	34.4	E
July 12	C			....		36.3	E
26	C			....		35.4	E
30	C			....		36.0	W
Sept. 8	C			....		35.1	W
9	C			....		36.4	W

276. M. 911.

1884.							
June 21	C	21	55	48.69	-18	27	35.1
25	C			48.73			....
July 12	C			48.66			35.0
19	C			48.67			36.0
30	C			48.65			34.8
Sept. 11	C			48.64			36.0

277. 34 α Aquarii.*

1884.							
June 25	C	21	59	49.58	-	0	52
July 12	C			49.58			....
19	C			49.56			58.9
30	C			49.49			59.0
Sept. 11	C			49.51			58.5
1885.							58.3
Aug. 18	H			52.66			....
Sept. 14	H			52.65			41.7

278. 33 ι Aquarii.*

1884.							
July 25	C	22	0	10.82	-14	25	....
26	C			10.29			54.6
Sept. 8	C			10.33			55.2
9	C			10.36			56.2
1885.							
Sept. 13	H			13.53			39.1

20 Cephei,* U. C.

1885.							
Aug. 18	H	22	1	30.78			....

20 Cephei,* S. P.

279. 26 γ Pegasi.*

1884.							
June 21	C	22	4	20.87	+	5	37
25	C			20.99			....
July 12	C			20.96			39.2
19	C			20.89			38.6
25	C			20.82			39.1
30	C			20.86			38.6
Sept. 11	C			20.89			39.7
1885.							
Aug. 18	H			23.90			....

24 *Cephei*,* U. C.

1884.								
June 21	C	22	7	34.46	+71	46	12.3	E
25	C			34.70			....	E
July 12	C			34.51			11.2	E
19	C			34.53			....	W
25	C			34.37			11.0	E
26	C			34.64			10.6	E
30	C			34.52			10.5	W
1885.								
Aug. 18	H			35.72			....	E

24 *Cephei*,* S. P.

1885.								
April 3	H	22	7	35.67	+71	46	30.4	E
28	H			35.84			30.4	W
May 4	H			35.76			....	W

280. 43 δ *Aquarii*,*

1884.								
June 21	C	22	10	42.75	— 8	21	38.2	E
25	C			42.66			....	E
July 12	C			42.74			38.7	E
19	C			42.72			37.8	W
25	C			42.74			37.7	E
26	C			42.72			38.6	E
30	C			42.77			37.5	W
Sept. 8	C			42.70			38.0	W
11	C			42.78			37.3	W
1885.								
Aug. 18	H			45.92			....	E

281. 47 *Aquarii*.

1884.								
June 25	C	22	15	12.32	—22	10	....	E
July 12	C			12.37			44.7	E
19	C			12.42			46.0	W
30	C			12.36			44.0	W
Sept. 11	C			12.28			46.2	W
1885.								
Sept. 13	H			15.64			26.7	E

282. 48 γ *Aquarii*,*

1884.								
July 25	C	22	15	39.96	— 1	58	17.2	E
26	C			39.93			17.5	E
Sept. 8	C			39.90			17.8	W
9	C			39.87			18.3	W
1885.								
Aug. 18	H			43.04		57	....	E
Sept. 14	H			42.93			39.9	E

283. 50 *Aquarii*.

1884.							
June 25	C	22 18	14.26	-14 7	....		E
July 12	C		14.19			1.6	E
19	C		14.12			1.7	W
25	C		14.21			0.6	E
30	C		14.22			0.6	W
1885.							
Sept. 13	H		17.49		6 43.9		E

3 *Lacertae*.*

1884.							
July 26	C	22 18	59.89	+51 38	53.0		E
27	C		.....		53.0		E
Sept. 8	C		.....		53.0		W
9	C		59.92		52.8		W
11	C		61.08		52.0		W
1885.							
Aug. 18	H	19	2.26	39	....		E
Sept. 14	H		2.26		11.2		E

284. 57 σ *Aquarii*.

1884.							
July 12	C	22 24	30.53	-11 16	16.2		E
19	C		30.46		15.9		W
25	C		30.47		16.3		E
26	C		30.52		16.7		E
30	C		30.49		15.9		W
Sept. 11	C		30.43		17.7		W

7 *Lacertae*.*

1884.							
July 19	C	22 26	.....	+49 41	10.8		W
25	C		30.68		11.4		E
26	C		30.69		10.9		E
27	C		.....		10.8		E
30	C		30.80:2		10 5		W
1885.							
Aug. 28	H		33.32		....		E
Sept. 13	H		33.25		30.1		E
14	H		33.28		29.1		E

285. 59 ν *Aquarii*.

1884.							
July 12	C	22 28	20.88	-21 18	7.6		E
19	C		20.82		8.9		W
25	C		20.91		6.9		E
30	C		20.89		7.0		W
Sept. 11	C		20.79		8.7		W
1885.							
Sept. 14	H		24.28		17 49.9		E

PUBLICATIONS OF THE

286. 62 η Aquarii.*

1884.								
July 26	C	22	29	23.77	— 0	42	54.4	E
Sept. 8	C			23.76			54.5	W
9	C			23.70			54.8	W
1885.								
Aug. 28	H			26.83			....	E
Sept. 5	H			26.77			....	E
13	H			26.79			36.9	E
14	H			26.76			....	E

10 Lacertae.*

1885.								
Aug. 28	H	22	34	6.04			....	E
Sept. 1	H			6.04			....	E
5	H			6.11			....	E

 ϵ Piscis australis.

1884.								
July 12	C	22	34	.....	—27	38	52.3	E
25	C			.....			53.6	E
26	C			.....			54.4	E
30	C			.....			54.4	W
Sept. 8	C			14.28			54.5	W
9	C			.....			54.8	W
1885.								
Sept. 13	H			.....			36.3	E
14	H			.....			35.8	E

 ζ Pegasi.*

1885.								
Aug. 28	H	22	35	43.62			....	E
Sept. 1	H			43.53			....	E
5	H			43.61			....	E

287. 66 g Aquarii.

1884.								
July 12	C	22	37	20.66	—19	26	13.4	E
19	C			20.62			13.8	W
25	C			20.66			13.0	E
26	C			20.76			12.9	E
30	C			20.61			13.3	W
1885.								
Sept. 13	H			23.86		25	55.7	E

 η Pegasi.*

1885.								
Aug. 28	H	22	37	36.72			....	E
Sept. 1	H			36.68			....	E
4	H			36.70			....	E
5	H			36.70			....	E

λ Pegasi.*

1884.							
July 27	C	22 40	56.55	+22 57	19.6	E	
1885.							
Aug. 28	H		59.59		....	E
Sept. 1	H		59.53		....	E
4	H		59.50		....	E
5	H		59.55		....	E

288. 71 τ Aquarii.*

1884.						
July 12	C	22 43	26.93	-14 12	16.6	E
19	C		26.93		17.4	W
25	C		26.95		16.7	E
26	C		26.98		16.6	E
30	C		26.96		16.3	W
1885.						
Sept. 13	H		30.13	11	58.2	E

 ι Cephei.*

1885.						
Aug. 28	H	22 45	35.18		....	E
Sept. 1	H		35.26		....	E
4	H		35.19		....	E
5	H		35.42		....	E

289. 73 λ Aquarii.*

1884.						
July 12	C	22 46	33.70	- 8 11	47.7	E
19	C		33.73		47.4	W
25	C		33.82		48.2	E
26	C		33.75		48.6	E
30	C		33.73		48.0	W
Sept. 8	C		33.70		48.1	W
1885.						
Sept. 1	H		36.93		....	E
5	H		36.88		....	E

 δ Aquarii.*

1885.						
Sept. 1	H	22 48	32.86		....	E
5	H		32.83		....	E

 α Piscis australis.*

1884.						
July 27	C	22 51	14.31	-30 14	11.5	E
1885.						
Sept. 1	H		17.74	13	....	E
5	H		17.62		....	E
14	H		17.67		55.3	E

PUBLICATIONS OF THE

290. BRADLEY 3033.

1884.									
July	12	C	22	51	17.04	— 5	25	47.8	E
	19	C			16.92			....	W
	25	C			16.80			46.6	E
	26	C			16.98			47.6	E
	30	C			16.90			47.2	W
Sept.	8	C			16.89			47.8	W
	9	C			16.97			48.0	W

 α *Andromedae*.*

1885.									
Sept.	1	H	22	56	37.83			....	E
	4	H			37.80			....	E
	5	H			37.81			....	E

 β *Pegasi*.*

1885.									
Aug.	28	H	22	58	11.94			....	E
Sept.	1	H			11.90			....	E
	4	H			11.89			....	E
	5	H			12.02			....	E

 α *Pegasi*.*

1885.									
Aug.	28	H	22	59	1.97			....	E
Sept.	1	H			1.89			....	E
	4	H			2.06			....	E
	5	H			1.98			....	E

291. 83 *h Aquarii*.

1884.									
July	12	C	22	59	6.92	— 8	19	10.8	E
	19	C			6.86			9.9	W
	26	C			6.86			11.3	E
	30	C			6.88			11.5	W
Sept.	8	C			6.81			11.2	W
	9	C			6.81			11.4	W

292. 88 *c² Aquarii*.*

1884.									
July	12	C	23	3	15.64	—21	48	7.3	E
	25	C			15.63			6.1	E
Sept.	8	C			15.68			7.2	W
	9	C			15.66			6.9	W
1885.									
Sept.	1	H			18.85		47	....	E
	14	H			18.90			47.5	E

π Cephei,* U. C.

1884.								
July 19	C	23	4	12.43	+74	45	38.7	W
26	C			12.52			37.4	E
27	C			12.54			37.9	E
30	C			12.69			37.0	W
1885.								
Aug. 28	H			14.50			....	E
Sept. 1	H			14.59			....	E
4	H			14.52			....	E
5	H			14.43			....	E

 π Cephei,* S. P.

1885.								
April 28	H	23	4	14.42	+74	45	....	W
May 10	H			14.40			....	W
12	H			14.66			57.7	W

BRADLEY 3077.*

1885.								
Aug. 28	H	23	7	44.83	+56	32	....	E
Sept. 1	H			45.00			....	E
4	H			44.94			....	E
13	H			44.80			1.5	E
14	H			44.84			0.6	E

293. 6 γ Piscium.*

1884.								
July 19	C	23	11	9.10	+ 2	38	54.5	W
25	C			9.07			54.2	E
26	C			9.26.x			54.3	E
30	C			9.10			54.9	W
Sept. 8	C			9.10			54.9	W
1885.								
Sept. 13	H			13.25		39	13.6	E

 τ Pegasi.*

1884.								
July 27	C	23	14	53.73	+23	6	19.3	E
1885.								
Aug. 28	H			56.83			....	E
Sept. 1	H			56.75			....	E
4	H			56.77			....	E

294. 93 δ^1 Aquarii.

1884.								
July 12	C	23	16	52.53	-20	44	0.7	E
19	C			52.66			..	W
25	C			52.69			1.1	E
26	C			52.72			1.4	E
30	C			52.61			1.9	W
Sept. 8	C			52.64			2.1	W
9	C			52.66			1.3	W

4 *Cassiopeiae*.*

1885.							
Aug. 28	H	23	19	43.95	....	E	
Sept. 4	H			43.90	....	E	

295. 8 κ *Piscium*.*

1884.							
July 12	C	23	20	59.20	+ 0 37	13.8	E
19	C			59.19		15.0	W
25	C			59.21		14.4	E
26	C			[59.09;x]		14.1	E
27	C			59.21		14.8	E
30	C			59.22		13.8	W
1885.							
Sept. 4	H	21		2.36	....	E	
13	H			2.28	33.7	E	

70 *Pegasi*.*

1885.							
Aug. 28	H	23	23	20.40	....	E	
Sept. 4	H			20.30	....	E	

296. 101 b^s *Aquarii*.

1884.							
July 12	C	23	27	12.43	-21 33	19.7	E
19	C			12.46		21.1	W
25	C			12.42		20.7	E
26	C			12.46		20.7	E
30	C			12.38		19.8	W
1885.							
Sept. 14	H			15.53	0.1	E	

297. M. 974.

1884.							
July 12	C	23	29	33.15	- 8 6	21.5	E
19	C			33.02		21.7	W
25	C			33.13		24.0	E
26	C			33.15		23.6	E
30	C			33.09		22.9	W
1885.							
Sept. 14	H			36.12	4.4	E	

 λ *Andromedae*.*

1884.							
July 19	C	23	31	53.39	+45 49	46.6	W
25	C			53.19		46.9	E
26	C			53.27		47.1	E
30	C			53.31		46.8	W
1885.							
Sept. 14	H			.....	50 5.2	E	

*ι Andromedae.**

1885.							
Aug. 28	H	23	32	29.85	....	E	
Sept. 4	H			29.73	....	E	

298. 17 *ι Piscium **

1884.							
July 19	C	23	33	59.04	+ 4 59	51.0	W
25	C			59.15		51.3	E
27	C			59.05		51.5	E
30	C			59.05		51.6	W
1885.							
Sept. 14	H		34	2.08	+ 5 0	10.5	E

γ Cephei, U. C.*

1884.							
July 12	C	23	34	35.60	+76 59	5.4	E
Sept. 6	C			35.78		6.3	W
9	C			35.77		6.6	W
12	C			36.32		5.9	W
1895.							
Aug. 28	H			38.18		....	E
Sept. 4	H			38.24		....	E

γ Cephei, S. P.*

1884.							
May 10	H	23	34	35.67	+76 59	8.2	E
1885.							
April 28	H			38.23		....	W
May 10	H			38.16		26.1	W
12	H			38.20		27.0	W
13	H			38.03		27.4	E

299. 105 *ω Aquarii.**

1884.							
July 12	C	23	36	42.37	-15 11	10.1	E
19	C			42.36		10.4	W
25	C			42.46		11.2	E
26	C			42.48		10.3	E
30	C			42.40 _x		10.5	W
1885.							
Aug. 28	H			45.33	10	....	E
Sept. 4	H			45.55		....	E
14	H			45.56		52.3	E

41 H. *Cephei,* U. C.*

1884.							
July 25	C	23	42	22.19	+67 9	48.9	E
26	C			22.26		44.1	E

41 H. *Cephei*,* S. P. δ *Sculptoris*.*

1884.						
July 19	C	23 42	52.97	—28 46	18.2	W
30	C		52.87		19.6	W
Sept. 17	C		53.03		19.8	W
28	C		.....		18.9	E
1885.						
Sept. 14	H		56.08	45 59.4		E

300. M. 986.

1884.						
July 12	C	23 44	15.56	-10 37	20.0	E
27	C		15.55		18.0	E
30	C		15.67		17.6	W
Sept. 9	C		15.58		18.2	W

301. 108 ι^2 *Aquarii*.

1884.						
July 25	C	23 45	21.95	-19 33	15.2	E
26	C		22.02		14.7	E
Sept. 8	C		21.88		16.2	W
12	C		21.84		16.1	W
1885.						
Sept. 14	H		24.98	32 54.6		E
Oct. 22	H		25.00	....		E

302. 27 *Piscium*

1884.						
July 12	C	23 52	44.01	- 4 11	58.6	E
19	C		44.10		59.8	W
30	C		44.02		58.6	W
Sept. 12	C		44.10		59.8	W
17	C		44.07		57.6	W
28	C		44.07		58.9	E

 ω *Piscium*.*

1885.						
Sept. 14	H	23 53	24.33	+ 6 13	34.9	E
Oct. 22	H		24.37		35.8	E

303. 2 *Ceti*.

1884.						
July 12	C	23 57	47.86	-17 58	54.5	E
19	C		47.73		54.5	W
30	C		47.85		55.1	W
Sept. 12	C		47.80		54.9	W
17	C		47.85		55.6	W
20	C		47.86		55.5	E

VIII. METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1885.

The following 13 pages contain the daily meteorological observations which are taken at the observatory, three times daily at 7 A. M., 2 P. M. and 9 P. M of Central Time.

The instruments employed and their situations are described in *Publications of the Washburn Observatory*, vol. II, p. 290.

The thermometric readings are taken from the Signal Service instrument, GREEN No. 515.*

During September, 1885, I had the graduation of this instrument examined at ten different points by the Thermometric Bureau of the Winchester Observatory of Yale College, New Haven, Connecticut. The corrections required to reduce 515 to their standard are as below:

Reading of S. S. No. 515.	Correction to S. S. No. 515.
- 2°	-0° .5
+10	-0 .6
20	-0 .6
32	-0 .3
42	-0 .1
52	-0 .2
62	-0 .1
72	-0 .0
82	-0 .0
+92	+0 .2

These corrections have *not* been applied to the numbers in the following tables.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF JANUARY, 1885.

DAY.	OBSERVATIONS TAKEN AT 7. A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum Ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	29.381	- 8.0	86	.....	6	-12	20	329
2	29.477	- 0.8	78	.....	5	-16	18	170
3	29.251	17.1	76	.....	20	0	30	488
4	29.029	25.6	82	.....	30	15	28	282
5	28.702	32.1	85	0.15	35	25	33	434
6	28.321	29.1	96	1.30	34	26	25	326
7	28.731	24.9	85	.....	28	19	18	197
8	28.569	33.6	89	.....	37	25	20	206
9	29.045	21.8	77	.....	40	15	24	307
10	28.930	23.8	72	.....	30	8	28	264
11	28.456	30.8	83	.....	35	28	32	347
12	29.130	- 3.4	76	.....	29	-11	30	324
13	29.453	- 8.5	75	.....	3	-19	15	171
14	29.400	2.1	76	0.20**	4	- 5	12	115
15	29.266	5.0	68	0.05**	8	0	17	262
16	29.017	4.4	78	0.44**	6	- 1	25	399
17	29.230	- 4.5	84	0.06**	5	- 9	24	394
18	29.439	-12.9	73	.....	- 8	-15	15	211
19	29.336	-13.0	57	.....	- 7	-22	13	158
20	28.973	0.2	71	.....	5	-14	24	388
21	29.311	-14.0	57	.....	2	-16	17	300
22	29.324	- 5.7	53	.....	1	-25	20	159
23	28.898	13.0	90	0.08**	15	- 6	36	545
24	28.716	16.8	84	0.12**	22	13	10	82
25	28.818	- 0.4	75	.....	13	- 6	22	178
26	28.906	- 8.5	60	.....	- 2	-12	26	293
27	29.043	-10.0	62	.....	- 6	-12	14	159
28	29.112	-10.6	59	.....	- 2	-23	15	94
29	29.071	6.5	78	0.02**	14	-13	18	207
30	29.133	8.7	91	.....	16	2	15	94
31	28.902	23.0	91	0.02**	27	4	28	150
Sums.	.....	.....	.....	2.44	.....	.....	.....	8,042
Means	29.045	7.0	76.3	.....	.....	.....	.....	.....

Highest barometer, 29.580 inches; lowest, 28.146 inches. Highest temperature, 40°; lowest, -25°. Range of barometer, 1.434 inches. Range of thermometer, 65°. Maximum velocity of wind, 36 miles from S. E. Prevailing winds, S. W., N. W. Number of clear days, 16; fair days, 8; cloudy days, 7. Number of times wind blew from the N., 13; N. E., 1; E., 1; S. E., 2; S., 11; S. W., 26; W., 12; N. W., 24. (Three observations daily.)

* Precipitation too small to be measured.

** Melted snow.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
FEBRUARY, 1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	29.260	9.2	81	.....	27	4	25	275
2	28.817	20.4	96	0.02*	26	6	26	208
3	28.445	23.6	97	.....	31	16	20	110
4	28.520	25.7	96	0.09	33	21	24	163
5	28.911	1.8	87	0.02*	22	— 1	28	328
6	28.789	12.9	91	0.05	17	— 1	17	129
7	28.774	10.9	89	0.08	16	3	8	37
8	29.036	8.2	76	.....	12	0	12	134
9	28.755	0.6	94	0.40*	9	— 4	36	499
10	28.907	— 17.6	68	.....	— 4	— 21	25	349
11	28.874	— 5.2	83	.....	2	— 22	28	309
12	29.073	— 9.6	86	.....	— 4	— 15	14	232
13	28.951	— 4.4	90	.....	1	— 18	16	182
14	28.764	2.8	92	0.10	9	— 11	15	178
15	28.669	2.2	88	0.06	11	— 5	15	78
16	28.742	— 9.8	86	.....	— 4	— 18	20	403
17	28.862	0.7	72	.....	8	— 14	24	193
18	29.108	2.2	81	.....	7	— 8	18	273
19	29.106	— 4.0	85	.....	6	— 7	20	328
20	29.156	0.4	78	.....	8	— 9	16	262
21	29.247	1.5	80	.....	10	— 11	5	93
22	29.427	8.2	87	.....	17	— 4	8	117
23	29.374	11.4	86	.....	21	— 6	11	57
24	29.150	20.5	89	.....	28	12	12	122
25	29.098	24.3	85	.....	32	10	9	111
26	28.865	28.7	82	.....	35	25	17	152
27	28.896	30.0	77	.....	38	19	20	166
28	28.760	33.7	86	.....	40	25	18	211
Sums.	.....	.....	.....	0.82	.....	.....	.....	5,699
Means	28.940	8.2	85.0	.....	.....	.....	.....	.....

Highest barometer, 29.464 inches; lowest, 28.399 inches. Highest temperature, 40°; lowest, —22°. Range of barometer, 1.065 inches. Range of thermometer, 62°. Maximum velocity of wind, 36 miles from North. Prevailing winds, N. W. and W. No. of clear days, 11; fair days, 15; cloudy days, 2.

Number of times the wind blew from the N., 11; N. E., 5; E., 0; S. E., 3; S., 11; S. W., 10; W., 17; N. W., 21. (Three observations daily.)

* Estimated.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
MARCH, 1885.

Day.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	28.872	28.7	78	—*	32	26	26	350
2	28.737	30.9	85	—*	35	21	20	251
3	28.588	33.9	75	0.03	38	31	28	425
4	29.019	31.2	70	.....	35	29	20	338
5	29.121	29.0	82	0.07	36	25	13	154
6	28.967	24.4	93	0.43	32	19	18	291
7	29.185	15.5	81	.....	22	13	27	452
8	29.214	22.9	72	.....	30	7	10	109
9	28.867	35.3	71	.....	44	23	40	431
10	29.317	19.4	64	.....	35	18	22	323
11	29.039	27.1	75	.....	37	12	16	256
12	29.181	26.4	82	.....	30	24	20	239
13	28.994	30.8	84	0.02	36	24	13	245
14	28.526	30.6	70	0.02	43	23	28	383
15	28.814	16.8	66	.....	23	14	45	537
16	29.167	4.6	76	0.03	16	2	25	326
17	29.119	11.6	72	.....	18	— 5	21	227
18	28.908	18.1	80	0.01	22	11	28	419
19	28.985	9.0	71	.....	19	5	22	278
20	29.123	4.4	70	.....	9	— 1	30	309
21	29.229	10.4	74	.....	16	1	9	95
22	29.290	15.4	69	.....	20	8	16	198
23	29.105	25.7	61	.....	33	10	26	267
24	29.158	25.4	79	.....	35	21	32	467
25	29.039	29.7	67	.....	36	12	36	321
26	28.756	43.9	66	.....	54	28	58	392
27	28.927	33.8	70	.....	45	29	30	257
28	29.074	27.9	77	.....	32	25	14	199
29	29.052	31.2	81	0.01	37	20	17	163
30	28.818	35.9	67	.....	43	32	26	433
31	29.064	42.1	75	.....	51	36	34	353
Sums.	.....	.....	.....	0.62	.....	.....	.....	9,488
Means	29.007	24.9	74.3	.....	.....	.....	.....	.....

Highest barometer, 29.346 inches; lowest, 28.398 inches. Highest temperature, 54°; lowest, —5°. Range of barometer, 0.948 inches. Range of thermometer, 59°. Maximum velocity of wind, 45 miles from N. W. Prevailing winds, N. W. and W.

Number of clear days, 8; fair days, 17; cloudy days, 6.

Number of times the wind blew from the N., 10; N. E., 9; E., 4; S. E., 6; S., 15; S. W., 11; W., 18; N. W., 20. (Three observations daily.)

*Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF APRIL
1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	29.128	36.4	72	.....	44	32	15	215
2	29.941	33.1	87	0.48	38	32	24	261
3	29.165	31.0	77	.....	36	27	32	502
4	28.911	37.0	76	.....	44	26	19	218
5	28.768	49.0	60	.....	58	36	25	342
6	28.888	47.8	70	.....	58	32	24	285
7	28.699	39.0	95	0.20	54	31	24	408
8	29.203	29.6	71	.....	37	21	30	401
9	29.118	35.3	72	.....	44	28	16	190
10	28.684	37.2	87	0.31	44	26	33	351
11	28.790	37.4	60	.....	42	36	30	355
12	29.019	33.3	67	—*	38	30	24	254
13	29.232	30.8	67	.....	40	23	25	356
14	28.925	33.2	93	0.48†	34	29	30	387
15	28.861	35.4	97	.....	41	34	22	228
16	28.978	36.4	96	0.05	38	33	18	284
17	28.968	34.2	90	0.94	37	32	10	319
18	29.132	42.7	92	.....	47	34	14	148
19	29.244	48.8	87	.....	55	40	19	100
20	29.062	58.8	88	0.02	69	44	26	239
21	28.918	65.3	71	.....	74	55	34	529
22	28.815	61.6	69	0.04	72	42	38	606
23	28.963	45.1	90	0.56	59	41	40	325
24	29.193	46.8	72	0.16	55	40	14	125
25	28.958	44.4	82	.....	52	38	16	168
26	28.992	48.6	67	.....	58	40	25	228
27	29.019	45.6	79	.....	56	41	20	181
28	29.047	42.0	70	0.16	54	33	30	436
29	28.887	51.0	70	0.02	60	36	30	356
30	28.834	46.4	57	0.03	52	44	28	302
Sums.	.....	.....	.....	3.45	.....	.....	.....	9,099
Means	28.977	42.0	77.7	.....	.....	.....	.....	.....

Highest barometer, 29.272 inches; lowest, 28.565 inches; highest temperature, 74°; lowest, 21°; range of barometer, 0.707 inches; range of thermometer, 58°; maximum velocity of wind, 40 miles from S. W.; prevailing winds, South; No. of clear days, 5; fair days, 12; cloudy days, 13.

No. of times the wind blew from the N., 15; N. E., 8; E., 11; S. E., 11; S., 18; S. W., 8; W., 4; N. W., 15. (Three observations daily.)

* Inappreciable.

† Melted Snow.

**METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF MAY
1885.**

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	28.953	45.3	55	.....	54	33	22	276
2	29.110	42.3	49	.....	52	33	16	218
3	28.889	48.3	60	0.01	56	39	25	312
4	28.787	56.4	51	.....	65	39	21	196
5	28.573	48.4	87	0.22	59	44	32	461
6	28.601	42.8	79	0.05	56	37	18	190
7	28.741	36.6	56	.....	42	27	40	502
8	28.662	36.2	70	0.06	42	35	40	625
9	28.882	41.6	59	.....	47	34	28	459
10	28.938	47.8	54	.....	57	36	24	242
11	28.990	46.8	66	.....	60	33	14	180
12	28.951	55.6	56	.....	66	39	14	174
13	29.054	58.6	72	.....	72	45	12	80
14	29.111	61.0	53	.....	75	45	14	170
15	29.019	64.1	58	.....	75	49	28	302
16	28.881	65.7	55	0.14	76	55	42	564
17	28.754	52.3	86	0.12	68	58	22	262
18	28.905	46.2	88	0.10	62	45	26	343
19	29.028	44.6	83	.....	47	38	25	336
20	29.050	55.0	75	.....	62	45	9	98
21	29.053	62.1	60	.....	72	45	6	89
22	28.983	67.1	59	.....	81	51	10	112
23	28.928	68.4	63	.....	82	56	12	102
24	28.768	68.1	73	0.06	84	57	16	162
25	28.926	65.5	50	.....	75	59	36	297
26	28.994	68.2	42	.....	81	58	20	212
27	29.026	61.1	52	.....	72	52	16	183
28	28.944	60.1	65	.....	70	54	15	112
29	28.745	53.2	89	0.92	59	51	18	251
30	28.720	63.9	63	.....	77	51	19	274
31	28.775	67.0	47	.....	77	57	16	171
Sums.	.....	.....	.....	1.68	.....	.....	.....	7,955
Means	28.898	54.8	63.7	.....	.....	.....	.....	.....

Highest barometer, 29.184 inches; lowest, 28.504 inches. Highest temperature, 84°; lowest, 27°. Range of barometer, 0.680 inches. Range of thermometer, 57°. Maximum velocity of wind, 42 miles from S. W. Prevailing winds, Northwest.

Number of clear days, 11; fair days, 15; cloudy days, 5.

Number of times the wind blew from the N., 14; N. E., 6; E., 6; S. E., 13; S., 15; S. W., 8; W., 12; N. W., 19. (Three observations daily.)

**METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
JUNE, 1885.**

Day.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., and 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	28.890	67.0	61	.....	81	55	8	136
2	28.884	67.0	84	0.64	78	58	18	206
3	28.902	65.1	85	.....	74	60	30	191
4	28.718	60.2	94	1.73	66	57	14	160
5	28.907	62.5	76	.....	74	57	25	232
6	28.713	71.5	82	0.01	79	56	35	351
7	28.663	71.0	78	1.16	84	62	36	356
8	29.063	51.5	64	.....	65	42	45	480
9	29.172	58.0	62	.....	70	46	14	146
10	29.148	60.7	75	.....	73	50	14	150
11	29.019	69.0	71	.....	80	53	12	269
12	28.840	72.9	77	.....	80	63	25	336
13	28.782	71.5	63	0.01	82	66	40	414
14	28.835	68.9	83	0.42	77	62	36	195
15	28.829	63.7	69	0.05	72	59	23	333
16	29.110	58.6	63	.....	69	52	(?)	219
17	29.131	62.4	61	.....	74	54	(?)	202
18	29.149	66.2	65	.....	76	57	(?)	199
19	29.023	67.9	78	0.06	78	56	27	321
20	28.889	71.2	81	0.28	82	65	26	209
21	28.890	63.0	74	0.17	71	57	20	227
22	29.172	55.2	63	.....	63	47	28	381
23	29.180	61.3	64	.....	74	51	8	137
24	29.167	65.8	68	.....	72	54	10	120
25	29.080	71.0	72	.....	80	61	15	136
26	28.977	72.9	81	0.42	83	65	18	224
27	28.913	71.0	83	0.04	81	65	18	167
28	29.070	65.6	87	0.12	74	64	18	246
29	29.250	59.7	58	.....	71	53	29	171
30	29.237	62.9	61	.....	73	50	10	111
Sums.	.....	.....	.....	5.11	.....	.....	.....	7,935
Means	28.987	65.2	72.8	.....	.....	.....	.....	.....

Highest barometer, 29.287 inches; lowest, 28.566 inches; highest temperature, 84°; lowest, 42°; range of barometer, 0.721 inches; range of thermometer, 42°; maximum velocity of wind, 45 miles from South. Prevailing winds, S. W., N. W. and S.

Number of clear days, 12; fair days, 14; cloudy days, 4; number of times the wind blew from the N., 4; N. E., 6; E., 5; S. E., 7; S., 19; S. W., 20; W., 9; N. W., 20. (Three observations daily.)

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF JULY,
1885.

DAY	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of wind.	Total move- ment of the wind.
	Inches.	°	Pr. ct.	Inches.	°	°	Miles.	Miles.
1	29.110	66.5	63	.....	78	52	12	118
2	28.966	72.0	56	.....	83	59	13	173
3	28.964	71.5	66	.....	82	64	12	174
4	28.896	70.2	90	.....	78	66	40	239
5	28.798	70.5	87	0.66	83	64	25	309
6	28.750	68.1	75	.....	78	66	32	369
7	28.840	72.4	71	0.75	82	62	35	384
8	28.824	79.8	74	.....	87	68	30	377
9	28.946	68.8	75	0.75	81	66	72	351
10	29.073	64.1	73	.....	72	60	19	221
11	28.914	67.0	67	.....	78	58	8	88
12	28.914	70.0	74	.....	78	61	20	210
13	28.842	66.6	60	0.28	75	63	32	333
14	28.778	69.8	76	0.02	82	55	30	281
15	28.870	70.8	76	.....	83	62	24	147
16	28.774	74.2	89	1.44	85	62	36	428
17	29.169	62.6	73	.....	73	58	48	371
18	29.109	66.5	82	.....	76	60	12	128
19	28.932	75.0	82	.....	88	67	18	236
20	28.892	79.2	83	.....	88	67	a	279
21	28.997	75.5	78	0.04	83	70	25	211
22	29.007	72.3	85	2.21	85	66	14	146
23	28.906	78.3	82	.....*	89	68	60	241
24	28.914	75.5	89	0.08	84	71	28	162
25	28.934	71.8	93	0.13	82	67	12	94
26	29.086	71.9	72	0.02	81	64	36	250
27	29.076	74.3	76	.....	84	62	10	143
28	28.935	75.4	82	0.40	88	65	12	207
29	28.941	74.4	79	0.49	85	67	b	227
30	28.903	78.7	83	.....	90	67	58	173
31	28.946	77.3	77	0.03	87	73	12	82
Sums.	.....	.....	.....	7.30	.....	.....	.....	7,152
Means	28.941	75.2	76.4	.....	.....	.....	.....	.....

Highest barometer, 29.204 inches; lowest, 28.677 inches; highest temperature, 90°; lowest, 52°. Range of barometer, 0.527 inches. Range of thermometer, 38°. Maximum velocity of wind, 72 miles from N. W. Prevailing winds S. W.

Number of clear days, 11; fair days, 16; cloudy days, 4.

Number of times the wind blew from the N, 13; N. E., 0; E., 3; S. E., 5; S., 21; S. W., 28; W., 7; N. W., 16. (Three observations daily.)

a Wind blew for 8 minutes at the rate of 60 miles per hour, at 5:25 P. M., on the 19th.

b Wind blew for 2 minutes at the rate of 54 miles per hour, at 5:55 P. M., on the 28th.

Five times during the month, on the 8th, 19th, 22d, 28th and 26th the wind has blown from the N. and N. W., at velocities from 54 to 72 miles per hour.

*Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
AUGUST, 1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	28.939	71.0	71	—*	79	68	16	133
2	28.824	63.0	94	0.62	68	61	24	328
3	28.709	69.6	69	.....	79	59	25	391
4	28.871	65.4	61	.....	73	62	20	328
5	29.028	65.0	79	—*	77	57	25	261
6	28.831	65.7	89	0.26	68	61	18	256
7	28.880	69.6	91	.....	81	64	14	111
8	28.779	72.7	99	1.89	81	66	30	284
9	29.010	66.8	77	.....	71	65	20	225
10	29.095	66.7	92	.....	78	57	14	118
11	29.016	69.8	83	.....	79	59	15	183
12	28.858	72.7	78	.....	82	64	13	138
13	28.898	63.6	66	.....	72	59	20	245
14	29.084	59.1	73	.....	70	55	30	336
15	29.073	60.9	75	.....	72	52	13	150
16	29.081	62.8	69	.....	72	52	18	251
17	28.970	69.8	83	0.51	79	58	36	340
18	28.952	72.6	77	0.13	80	65	14	157
19	29.025	63.0	69	.....	73	59	20	177
20	28.827	67.9	76	—*	75	56	22	268
21	28.857	64.4	78	1.15	70	62	36	316
22	29.055	61.4	79	0.03	72	56	16	121
23	28.832	64.5	98	1.19	68	58	18	133
24	28.915	58.5	69	0.30	66	55	28	272
25	29.117	55.5	64	.....	62	47	22	374
26	29.289	53.3	73	.....	62	46	24	303
27	29.192	56.7	77	.....	65	50	10	107
28	29.065	62.5	78	0.03	69	54	15	175
29	28.982	58.8	89	0.30	66	56	14	160
30	28.928	60.4	74	.....	68	52	12	128
31	28.984	57.9	70	.....	66	51	16	211
Sums.	.....	.....	.....	6.41	.....	.....	.....	6,980
Means	28.967	64.2	78.0	.....	.....	.....	.....	.....

Highest barometer, 29.301 inches; lowest, 28.645 inches; highest temperature, 82°; lowest, 46°; range of barometer, 0.656 inches; range of thermometer, 36°; maximum velocity of wind, 36 miles, from S. W. Prevailing winds, South; No. of clear days, 13; fair days, 10; cloudy days, 8.

No. of times the wind blew from the N., 14; N. E., 7; E., 7; S. E., 6; S., 23; S. W., 10; W., 10; N. W., 16. (Three observations daily.)

* Precipitation too small to be measured.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF SEPTEMBER, 1885.

Day.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	29.138	51.0	73	.....	61	45	16	247
2	28.959	57.3	69	.....	69	46	30	354
3	29.007	53.0	67	.....	59	48	28	331
4	28.992	55.6	66	0.04	62	50	15	146
5	29.155	52.0	71	.....	60	45	15	195
6	29.155	53.6	75	.....	59	45	9	84
7	29.070	56.4	63	.....	68	50	12	146
8	28.460	58.4	94	2.60	62	58	20	257
9	28.867	54.8	98	0.05	58	53	30	425
10	29.081	53.2	80	.....	68	45	24	232
11	29.942	62.2	82	.....	67	52	23	330
12	28.692	67.6	90	0.59	75	61	30	529
13	28.755	63.3	69	.....	73	60	34	145
14	28.849	62.7	58	.....	71	60	26	376
15	28.981	59.9	71	.....	69	54	24	286
16	29.124	56.8	77	.....	67	47	25	190
17	29.146	62.9	87	.....	70	52	28	322
18	29.195	61.0	64	.....	70	53	10	96
19	29.160	62.2	84	0.22	71	58	20	84
20	29.064	66.6	88	.....	76	56	20	186
21	28.877	72.4	80	.....	79	63	25	280
22	29.032	54.8	60	.....	73	51	32	469
23	29.063	51.6	72	.....	60	42	28	233
24	28.877	59.4	71	.....	72	49	20	279
25	28.900	66.5	73	.....	78	44	22	316
26	29.138	64.3	76	.....	76	56	24	364
27	29.155	65.5	71	.....	76	55	20	153
28	29.047	64.2	80	.....	69	60	8	96
29	29.011	64.7	85	0.29	69	60	6	88
30	28.991	60.9	92	0.26	65	59	16	205
Sums.	.....	.....	.....	4.05	.....	.....	.....	7,444
Means	28.996	59.9	76.1	.....	.....	.....	.....	.....

Highest barometer, 29.234 inches; lowest, 28.392 inches. Highest temperature, 79°; lowest, 42°. Range of barometer, 0.842 inches. Range of thermometer, 37°. Maximum velocity of wind, 32 miles from North. Prevailing winds, South.

Number of clear days, 12; fair days, 2; cloudy days, 9.

Number of times the wind blew from the N., 7; N.E., 4; E., 5; S.E., 10; S., 25; S.W., 14; W., 10; N.W., 13. (Three observations daily.)

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
OCTOBER, 1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles</i>
1	28.988	56.6	90	.....	63	51	18	373
2	28.747	60.4	74	.....*	71	53	16	101
3	28.766	44.1	67	.....	61	41	28	423
4	28.892	42.0	65	.....	47	37	26	334
5	29.094	40.8	64	0.10	44	35	16	226
6	29.177	38.7	75	.....	47	30	10	142
7	28.955	41.9	91	0.29	47	39	28	322
8	29.220	39.5	77	.....	48	36	22	350
9	29.132	47.1	73	.....	57	35	24	288
10	29.061	52.2	76	.....	66	42	24	328
11	28.980	54.0	78	.....	67	43	22	267
12	28.787	53.4	80	.....	65	44	16	207
13	28.685	51.3	85	0.10	56	48	24	291
14	28.875	45.9	65	.....	55	39	24	349
15	28.717	53.4	63	.....	64	40	18	247
16	28.825	55.7	68	.....	68	44	19	136
17	28.984	50.5	52	.....	59	46	20	272
18	29.074	44.4	68	.....	51	37	15	127
19	28.784	38.5	94	0.69	45	35	34	229
20	28.958	34.2	85	0.10	40	33	40	451
21	29.077	36.6	77	.....	41	29	20	237
22	29.015	40.6	78	.....	50	33	20	200
23	29.164	38.0	81	.....	46	33	21	264
24	29.090	45.0	79	.....	55	33	28	216
25	29.024	52.5	83	.....	63	44	20	261
26	28.930	42.4	76	.....	64	47	16	231
27	29.053	40.8	89	.....	49	39	28	288
28	28.992	37.0	95	0.83	41	36	25	412
29	29.066	35.0	76	.....	41	31	24	421
30	29.083	31.6	78	.....	37	26	25	265
31	28.951	35.8	88	0.26	40	31	10	86
Sums.	.....	.....	.....	2.37	.....	.....	.....	8,339
Means	28.972	44.8	77.2	.....	.....	.....	.....	.....

Highest barometer, 29.241 inches; lowest, 28.652 inches; highest temperature, 71°; lowest, 26°; range of barometer, 0.589 inches; range of thermometer, 45°; maximum velocity of wind, 40 miles from North; prevailing winds. South; No. of clear days, 12; fair days, 10; cloudy days, 9.

Number of times the wind blew from the N., 20; N. E., 5; E., 1; S. E., 7; S., 24; S. W., 6; W., 9; N. W., 21. (Three observations daily.)

* Precipitation too small to measure.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF NOVEMBER, 1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	Inches.	°	Pr. ct.	Inches.	°	°	Miles.	Miles.
1	28.825	34.1	94	0.05	38	32	18	143
2	28.997	33.5	78	.....	35	31	18	305
3	28.986	34.6	83	.....	39	31	12	147
4	28.735	38.6	81	.....	44	33	14	190
5	28.772	38.2	87	.....	39	32	16	238
6	28.589	47.9	97	2.61	54	39	18	290
7	28.594	39.3	88	.....	52	38	25	325
8	28.974	35.6	92	.....	41	35	30	299
9	29.149	34.1	86	.....	40	32	10	121
10	29.019	38.7	85	.....	48	30	15	83
11	28.518	49.7	83	.....	55	38	28	359
12	28.650	40.9	85	.....	54	32	12	198
13	28.764	27.6	91	.....	33	22	24	368
14	28.807	27.9	81	.....	29	23	24	382
15	28.973	29.7	83	.....	33	27	13	216
16	29.026	34.1	92	.....	45	22	10	87
17	28.743	42.7	75	.....	50	33	22	290
18	28.839	40.8	85	.....	45	38	22	210
19	29.054	32.4	92	.....	40	31	25	331
20	28.772	35.9	81	0.03	49	31	22	192
21	28.837	32.6	67	.....	44	29	12	94
22	28.981	32.1	79	.....	29	34	36	444
23	29.161	33.9	76	.....	36	31	24	481
24	29.151	33.5	85	.....	36	30	20	266
25	29.147	30.2	86	.....	35	27	.....	144*
26	29.248	28.1	77	.....	32	26	.....	150*
27	29.257	30.4	92	.....	40	22	.....	120*
28	29.074	36.7	75	.....	43	31	25	278
29	29.021	38.6	79	.....	43	34	20	210
30	29.053	35.2	95	0.05	43	34	12	110
Sums.	.....	.....	.....	2.74	.....	.....	.....	7,071
Mean.	28.924	35.6	84.3	.....	.....	.....	.....	.....

Highest barometer, 29.307 inches; lowest, 28.457 inches. Highest temperature, 55°; lowest 22°. Range of barometer, 0.850 inches. Range of thermometer, 33°. Maximum velocity of wind, 36 miles from N. Prevailing winds, N. W.

Number of clear days, 3; fair days, 13; cloudy days, 14.

Number of times wind blew from N., 15; N. E., 6; E., 2; S. E., 5; S., 20; S. W., 3; W., 11; N. W., 27. (Three observations daily.)

* Anemometer out of order.

METEOROLOGICAL OBSERVATIONS FOR THE MONTH OF
DECEMBER, 1885.

DAY.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS ENDING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean daily barometer.	Mean daily temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Pr. ct.</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
1	29.166	35.0	86	.....	43	33	17	232
2	28.910	36.2	75	.....	42	28	24	207
3	28.809	36.1	69	.....	40	30	20	342
4	28.448	27.5	93	0.10†	37	21	15	195
5	28.790	11.5	89	.....	21	9	60	657
6	28.770	-0.7	91	.....	15	-6	28	394
7	29.015	-0.3	91	.....	5	-13	28	340
8	28.618	17.2	96	0.60†	20	3	18	268
9	28.458	20.4	91	0.54†	23	17	36	681
10	29.001	14.4	90	.....*	18	11	25	281
11	29.416	6.4	93	.....	13	4	14	212
12	29.299	9.5	96	0.15†	11	-1	18	198
13	28.936	13.2	93	0.15†	19	9	22	251
14	29.030	6.8	85	.....	12	0	18	242
15	28.913	15.5	93	.....	23	6	25	339
16	29.074	24.2	94	.....	28	12	12	146
17	29.097	23.6	90	.....*	30	20	12	131
18	28.948	32.1	78	.....	51	19	30	277
19	29.277	22.9	86	.....	33	17	26	439
20	29.111	29.2	68	.....	36	16	12	188
21	29.084	37.4	89	.....	40	30	28	360
22	28.781	41.2	96	0.06	43	35	24	340
23	28.941	34.9	78	.....	44	33	40	495
24	29.257	29.4	85	.....	33	25	20	207
25	29.524	24.1	73	.....	44	22	20	183
26	29.419	25.4	79	.....	37	18	25	244
27	29.125	28.0	85	0.10	32	24	28	336
28	28.950	33.0	87	0.05	35	30	10	95
29	28.789	35.0	97	0.47	36	32	12	147
30	28.513	31.8	97	1.37	36	31	15	169
31	28.931	28.3	96	.....	37	26	20	286
Sums.	.....	.....	.....	3.59	.....	.....	.....	8,822
Means	28.979	23.7	87.3	.....	.....	.....	.....	.....

Highest barometer, 29.539 inches; lowest, 28.259; highest temperature 51°; lowest, -13°. Range of barometer, 1.280 inches. Range of thermometer, 68°. Maximum velocity of wind, 60 miles from N. Prevailing winds N. W.

Number of clear days, 4; fair days, 14; cloudy days, 13.

Number of times the wind blew from the N., 11; N. E., 4; E., 3; S. E., 3; S., 19; S. W., 18; W., 14; N. W., 21. (Three observations daily.)

*Precipitation too small to measure.

†Melted snow.

METEOROLOGICAL OBSERVATIONS FOR THE YEAR 1885.

MONTH.	OBSERVATIONS TAKEN AT 7 A. M., 2 P. M., AND 9 P. M. MEANS REFER TO DAY ENDING 12 P. M.			FOR 24 HOURS END- ING 9 P. M.			FOR 24 HOURS ENDING 2 P. M.	
	Mean monthly barometer.	Mean monthly temperature.	Mean relative humidity.	Rain or melted snow.	Maximum temperature.	Minimum temperature.	Maximum ve- locity of the wind.	Total move- ment of the wind.
	<i>Inches.</i>	<i>°</i>	<i>Per cent</i>	<i>Inches.</i>	<i>°</i>	<i>°</i>	<i>Miles.</i>	<i>Miles.</i>
January ..	29.045	7.0	76.3	2.44	40	-25	36	8,042
February ..	28.940	8.2	85.0	0.82	40	-22	36	5,699
March	29.007	24.9	74.3	0.62	54	-5	45	0,488
April	28.977	42.0	77.7	3.45	74	21	40	9,099
May	28.898	54.8	63.7	1.68	84	27	42	7,955
June	28.987	65.2	72.8	5.11	84	42	45	7,945
July	28.941	75.2	76.4	7.80	90	52	72	7,152
August ...	28.967	64.2	78.0	6.41	82	46	36	6,980
September.	28.996	59.9	76.1	4.05	79	42	32	7,444
October ...	28.972	44.8	77.2	2.87	71	26	40	8,339
November.	28.924	35.6	84.3	2.74	55	22	36	7,071
December.	28.979	28.7	87.3	3.59	51	-13	60	8,822
Sums .....	.....	.....	.....	40.58	.....	.....	.....	93,126
Means	28.969	42.1	77.5	.....	.....	.....	.....	.....

Highest barometer, 29.580 inches; lowest, 28.146 inches. Highest temperature, 90°; lowest, -25°. Range of barometer, 1.434 inches. Range of thermometer, 115°. Maximum velocity of wind, 72 miles from N. W. Prevailing winds, N. W. and S. Number of clear days, 118; fair days, 153; cloudy days, 94. Number of times the wind blew from the N., 147; N. E., 61; E., 49; S. E., 78; S., 221; S. W., 162; W., 123; N. W., 233. (Three observations daily.)

IX. SUMMARY OF METEOROLOGICAL OBSERVATIONS TAKEN, AT MADISON, DURING THE PERIOD 1853-1886.

The Washburn Observatory takes regular meteorological observations, three times daily, for the purpose of continuing the valuable records which have been kept at the University of Wisconsin since 1853. The results of each month's observations are regularly published in various papers in Wisconsin, as well as in the *Monthly Weather Review* of the U. S. Signal Office, and they are thus available to those interested.

In order to obtain the greatest amount of useful information from these current monthly reports, it is necessary to compare them with the records for past years. It is for this reason that the present summary has been made, which is intended to supersede all previous abstracts.

SOURCES FROM WHENCE THE DATA OF THE FOLLOWING TABLES ARE DERIVED.

All the observations were made tri-daily, at 7 A. M., 2 P. M. and 9 P. M. Many of the original records are now at the observatory. Some, however, have been lost. The tables given below are made up as follows: 1853 January to 1864 June, from the manuscript records, supplemented by the observations given in *Results of Meteorological Observations made under the U. S. Patent Office and the Smithsonian Institution from the year 1854 to 1859 inclusive, Vol. I*; 1869 January to 1878 October, from manuscript records, supplemented by the annual reports of Prof. W. W. DANIELLS to the Regents of the University; 1878 October to 1883 April, from manuscript records of the U. S. Signal Service Station, at Madison; 1883 April to 1886 January, from manuscript records of observations taken at the Washburn Observatory.

OBSERVERS AND PLACES OF OBSERVATION.

From 1853 January to 1854 June, the observations were made by Prof. S. H. CARPENTER at the North Dormi-

tory, University. From 1854 June to 1856 January, the observations were made by Prof. J. W. STERLING, at the North Dormitory, University. From 1856 March to 1857 January, the observations were made by Dr. A. SCHUE, at his office on Main street, city of Madison. From 1857 January to 1864 May, the observations were made by Prof. J. W. STERLING, at the North Dormitory and the Main Building, University. From 1869 January to 1878 October, the observations were made by Prof. W. W. DANIELLS, at the Main Building, University. From 1878 October to 1883 April, the observations were made by Signal Sergeants F. M. M. BEALL and C. A. SHAW, at Brown's Block, city of Madison. From 1883 May to 1883 August, the observations were made by Mr. J. C. OFFICER at the North Dormitory, University. From 1883 August to 1883 December, the observations were made by Mr. JOHN TATLOCK and from 1884 January to 1886 January, by Mr. G. W. BROWN, at the Washburn Observatory.

NOTES ON THE OBSERVATIONS.

Besides the special remarks to each table, the following general facts should be noted:

In all cases where the observations were made for a portion of a month only, the rainfall, the number of days on which snow or rain fell, and the movement of wind have been omitted from the monthly means and sums. Up to October, 1879, the maximum and minimum temperatures given, were simply the highest and lowest readings of the thermometer at the regular hours of observation, viz.: 7 A. M., 2 P. M., and 9 P. M. After that date they are read from self-recording instruments. Up to October, 1879, the maximum velocity of the wind is simply the greatest velocity recorded (estimated) by the observer at the hours 7, 2, 9. The maximum velocity during May, June, July, 1883, is the greatest velocity recorded by the anemometer at the hours 7, 2, 9. During the rest of the series, it is the highest velocity of the 24 hours as read from the anemometer sheets. This is usually computed by selecting that five minutes of the anemometer sheets which contains the greatest number of miles, and by multiplying this by 12. In special cases of very

high winds (above 60 miles per hour) a shorter time than five minutes is sometimes taken as a basis for computation. Occasionally the rate of motion of high winds has been deduced by observing the times of consecutive clicks of the anemometer magnet by the mean-time clock.

A careful examination of all the original records by Mr. Brown has shown that the barometer readings between August, 1877, and October, 1878, are probably erroneous. The monthly means are constantly from 0.1 to 0.4 inch below the means of twenty years' observations for these months. They are accordingly omitted here.

Table I. gives the mean monthly barometer at 32°; mean monthly temperature, Fahr.; maximum and minimum recorded temperature for the month; the range of temperature for the month, which is the difference of the maximum and minimum temperatures; the rainfall for the month; the mean monthly relative humidity; the number of days on which rain or snow fell during the month; the prevailing wind of the month; the maximum velocity of the wind during the month; the miles traveled by the wind during the month.

Table II. gives a summary of the data of Table I, arranged by years, including the years 1869-1884 only, these years being complete.

TABLE I.—METEOROLOGICAL OBSERVATIONS BY MONTHS FROM JANUARY 1, 1853, TO JANUARY 1, 1886.

N. B.—See remarks at end of table.

OBSERVATIONS FOR JANUARY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent).	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
1853...	29.242	25.8	...	...	...	...	...	...	...	...	...
1854...	28.990	13.0	46	-19	65	...	...	6	S. W.	60	...
1857...	29.162	5.6	37	-25	62	...	45	[4]	N. W.	25	...
1858...	29.018	31.2	54	9	45	1.83	75	3	S. W.	25	...
1859...	29.040	20.7	42	-12	54	...	79	4	W.	35	...
1860...	...	21.9	44	-9	53	...	...	...	W.	25	...
1861...	28.941	15.0	35	-15	50	0.50	83	7	S. W.	35	...
1862...	29.046	14.5	36	-22	58	1.50	...	9	W.	25	...
1863...	28.948	25.7	48	4	44	...	...	7	S.	25	...
1864...	29.010	14.8	45	-29	74	0.60	...	3	S. W.	25	...
1869...	28.961	23.7	42	-11	53	2.69	94	7	S. W.	25	...
1870...	28.898	17.8	35	-12	47	3.25	86	10	S. W.	35	...
1871...	28.994	20.7	55	-2	57	2.32	91	9	N. W.	35	...
1872...	28.916	17.5	40	-15	55	1.20	90	6	S. W.	12	...
1873...	28.850	10.9	33	-21	54	1.40	98	8	N.	35	...
1874...	28.978	18.9	57	-12	69	3.64	90	10	S. W.	25	...
1875...	29.073	3.6	33	-25	58	0.90	97	13	W.	12	...
1876...	28.934	24.5	46	-6	52	2.31	91	10	W.	25	...
1877...	29.067	12.9	43	-16	59	1.00	87	5	S. W.	14	...
1878...	...	25.1	45	-9	54	0.40	90	3	N. W.	14	...
1879...	29.055	19.7	46	-22	68	0.79	63	8	N. E.	31	7,276
1880...	28.937	34.5	58	6	52	2.75	73	13	S.	40	8,688
1881...	29.062	12.6	35	-20	55	2.05	74	13	S.	25	6,506
1882...	28.968	22.4	48	-8	56	1.33	73	13	S. W.	38	7,480
1883...	29.043	8.5	35	-23	58	1.01	72	18	N. W.	25	6,666
1884...	29.074	9.2	42	-27	69	1.68	81	11	N. W.	36	8,986
1885...	29.045	7.0	40	-25	65	2.44	76	10	S. W.	36	8,042
Means.	29.009	18.0	43.4	-17	60.4	1.69	81.3	8.6	S. W.	33.0	7,663

OBSERVATIONS FOR FEBRUARY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
1853...	29.011	19.2	46	-10	56	.....	...	7	.....	...	.....
1854...	29.013	24.3	47	-5	52	.....	...	4	N. W.	45	.....
1857...	29.271	25.0	48	-13	61	1.75	71	6	S. W.	25	.....
1858...	29.088	16.4	39	-13	52	0.59	71	8	N. W.	25	.....
1859...	28.970	24.5	56	-5	61	.....	71	10	N. W.	25	.....
1860...	.....	23.4	50	-10	60	2.30	...	2	S.	25	.....
1861...	28.862	25.0	50	-5	55	1.45	80	7	S.	35	.....
1862...	29.005	14.5	43	-18	61	0.38	.....	5	W.	25	.....
1863...	29.080	21.7	43	-8	51	.....	.....	...	S. W.	25	.....
1864...	28.903	22.8	50	-19	69	2.10	....	4	N. W.	35	.....
1869...	28.932	22.9	50	-1	51	2.35	89	6	N. W.	35	.....
1870...	28.871	20.0	44	-15	59	1.35	88	6	N. W.	35	.....
1871...	28.859	23.7	46	-4	50	1.43	87	8	S.	35	.....
1872...	28.899	19.2	48	-10	58	0.40	88	3	W.	25	.....
1873...	28.857	15.6	40	-20	60	0.60	95	2	W.	12	.....
1874...	28.995	21.0	41	-10	51	0.95	91	4	S. W.	12	.....
1875...	28.955	3.4	27	-21	48	2.80	83	9	W.	12	.....
1876...	28.934	24.3	51	-12	63	1.60	91	7	S.	12	.....
1877...	29.108	32.6	52	15	37	0.30	86	2	N.	14	.....
1878...	.....	32.8	53	13	40	1.19	82	6	N.	14	.....
1879...	29.042	22.0	46	-12	58	2.54	70	11	N. W.	30	7,842
1880...	28.936	28.2	55	0	55	1.75	70	9	N. W.	35	8,740
1881...	29.047	18.9	44	-4	48	5.42	76	16	N. W.	40	8,128
1882...	29.052	33.2	64	4	60	1.74	73	11	W.	30	8,008
1883...	29.169	17.0	49	-17	66	1.64	72	16	W.	28	6,112
1884...	28.962	16.9	37	-13	50	2.12	84	19	N.	40	8,247
1885...	28.940	8.2	40	-22	62	0.82	85	8	N. W.	36	5,699
Means.	28.990	21.5	47.9	-9.1	57.0	1.65	81.1	7.5	N. W.	34.1	7,539

OBSERVATIONS FOR MARCH.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
1853...	28.968	32.3	61	7	54	.....	.....	6	N. W.	25	.....
1854...	28.920	36.2	66	10	56	.....	.....	5	N. W.	45	.....
1856...	29.080	25.9	52	-6	58	.....	.....	.....	W.	.....	.....
1857...	29.038	27.9	59	0	59	0.78	63	4	S. W.	25	.....
1858...	28.965	36.6	66	4	62	1.94	50	6	N. W.	25	.....
1859...	28.722	36.6	61	24	37	3.07	73	11	N. W.	35	.....
1860...	.....	39.1	65	19	44	0.27	40	4	W.	35	.....
1861...	28.968	29.0	56	9	47	.....	.....	6	N.	25	.....
1862...	28.819	28.0	36	6	80	[1.35]	.....	[6]	N. E.	25	.....
1863...	28.701	26.0	45	14	31	[1.50]	.....	[3]	N.	25	.....
1864...	28.859	32.0	53	4	48	1.40	.....	.....	N.	60	.....
1869...	28.948	25.5	59	-1	60	0.79	83	10	N. W.	25	.....
1870...	28.934	27.0	42	-3	50	3.85	85	13	N. W.	25	.....
1871...	28.814	35.4	60	20	40	2.96	75	9	W.	35	.....
1872...	28.758	23.8	40	3	37	2.18	82	11	N.	12	.....
1873...	28.586	30.8	52	-5	57	2.07	75	6	N. W.	25	.....
1874...	28.935	29.7	47	10	37	0.95	69	3	W.	25	.....
1875...	28.826	25.1	64	1	63	0.90	70	7	W.	25	.....
1876...	28.955	27.8	58	0	58	2.27	93	10	N. W.	12	.....
1877...	28.988	23.2	50	-1	51	3.40	84	12	N.	12	.....
1878...	.....	44.0	69	28	41	2.43	73	9	N.	12	.....
1879...	28.967	37.7	68	5	63	1.34	66	11	N. W.	40	8,626
1880...	29.006	36.6	57	7	50	2.11	68	8	W.	35	9,645
1881...	28.872	28.5	49	-1	50	4.34	74	10	N. W.	45	8,561
1882...	28.993	34.4	62	14	48	4.73	75	18	N. W.	34	9,734
1883...	28.995	27.1	53	1	52	0.38	71	10	N. W.	32	7,606
1884...	28.968	27.4	62	-9	71	2.31	78	14	N.	45	8,088
1885...	29.007	24.9	54	-5	59	0.62	74	8	N. W.	45	9,488
Means.	28.920	30.7	57.9	1.7	56.2	2.05	72.3	8.0	N. W.	39.4	8,820

OBSERVATIONS FOR APRIL.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches.).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
1853...	28.964	44.3	65	27	38	.....	.....	9	N. W.	60	.....
1854...	28.987	47.3	79	23	56	.....	.....	6	N. E.	25	.....
1856...	28.990	48.0	68	25	43	2.50	.....	...	S.	.....	.....
1857...	28.947	35.1	63	14	49	1.90	63	11	N. W.	25	.....
1858...	28.771	42.8	77	25	52	4.74	65	13	N. E.	25	.....
1859...	28.890	40.6	68	23	46	3.07	.....	8	S. W.	40	.....
1860...	.....	45.3	70	30	40	0.68	61	3	S.	35	.....
1861...	28.853	46.0	74	29	45	.....	.....	.....	S.	35	.....
1862...	28.993	42.5	62	19	43	2.00	.....	9	N.	25	.....
1863...	29.018	47.6	70	27	43	.....	.....	.....	S.	35	.....
1864...	28.950	43.7	74	34	40	1.40	.....	.....	N.	35	.....
1869...	28.868	36.7	63	12	51	2.72	75	9	W.	25	.....
1870...	28.949	49.7	78	34	44	0.18	54	3	S.	25	.....
1871...	28.692	46.0	83	33	49	2.00	61	11	S. W.	35	.....
1872...	28.870	45.8	77	23	54	1.82	58	10	S. W.	25	.....
1873...	28.801	42.4	80	29	51	1.26	66	5	N. W.	25	.....
1874...	29.031	36.8	63	13	50	1.26	66	7	N. E.	25	.....
1875...	28.882	43.3	62	11	51	1.87	68	7	S. W.	25	.....
1876...	28.880	49.4	66	30	36	2.65	72	8	S. W.	12	.....
1877...	28.977	45.3	74	18	56	0.00	74	2	N.	12	.....
1878...	.....	52.3	73	40	33	2.97	67	12	S. W.	20	.....
1879...	28.934	48.2	82	12	70	3.33	70	6	S.	48	7,613
1880...	28.883	46.6	78	23	55	5.48	65	13	W.	41	9,758
1881...	28.986	40.9	73	11	62	1.50	71	12	N. W.	28	6,228
1882...	29.009	44.9	78	22	56	4.21	71	13	E.	44	8,613
1883...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1884...	28.930	43.4	76	25	51	4.51	69	11	N. W.	45	8,874
1885...	28.977	42.0	74	21	53	3.45	78	13	S.	40	9,099
Means.	28.921	44.4	76.9	19.0	57.9	2.41	67.0	8.7	S.	41.0	8,364

OBSERVATIONS FOR MAY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing winds.	Maximum velocity of wind (miles per hr.)	Monthly movement of wind (miles).
1853...	28.963	54.6	81	37	44	.....	.....	13	N. W.	60	.....
1854...	28.855	57.5	78	39	39	.....	.....	15	S. E.	45	.....
1855...	29.017	61.9	87	34	53	2.60	46	5	N. E.	25	.....
1857...	28.914	53.0	80	23	57	5.28	54	.....	S.	35	.....
1858...	28.977	52.7	73	38	35	8.39	67	18	N. W.	25	.....
1859...	29.050	60.5	79	44	35	.....	57	9	S. W.	35	.....
1860...	.....	61.6	81	43	38	2.74	.....	14	.....	45	.....
1861...	28.928	53.0	85	34	51	2.10	.....	6	E.	35	.....
1863...	28.968	57.6	81	38	43	.....	.....	.....	N.	45	.....
1864...	28.864	55.0	84	33	51	.....	.....	3	S.	60	.....
1869...	28.916	54.4	82	41	41	4.90	73	12	N. E.	25	.....
1870...	28.853	65.0	85	49	36	1.09	52	6	S.	25	.....
1871...	28.909	61.0	86	38	48	3.31	61	9	N. E.	25	.....
1872...	28.855	57.5	79	39	40	2.83	61	9	N. W.	12	.....
1873...	28.842	55.2	76	39	37	3.53	66	10	E.	25	.....
1874...	28.893	59.4	90	42	48	2.14	67	7	N. E.	25	.....
1875...	28.858	59.0	83	31	52	2.61	58	8	S. W.	12	.....
1876...	28.969	59.5	83	36	47	5.18	69	15	S. W.	12	.....
1877...	28.991	60.7	83	34	49	1.02	73	2	S.	12	.....
1878...	.....	54.6	77	41	36	4.64	70	8	N. W.	14	.....
1879...	28.950	61.0	86	35	51	3.91	60	9	S. E.	36	7.482
1880...	28.936	65.5	86	44	42	4.45	62	15	S.	30	7.344
1881...	28.997	66.2	88	35	53	4.25	68	10	E.	36	5.750
1882...	28.976	51.7	78	33	45	2.89	72	14	N. E.	30	8.346
1883...	28.883	51.5	78	33	45	6.98	81	11	S. W.	.....	.....
1884...	28.919	57.1	78	36	42	4.21	67	14	S. W.	32	7.890
1885...	28.898	54.8	84	27	57	1.68	64	9	N. W.	42	7.955
Means	28.928	57.9	83.0	40.5	42.5	3.68	64.2	10.0	S. N. E.	34.3	7.461

OBSERVATIONS FOR JUNE.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr)	Monthly movement of wind (miles).
1853...	28.957	70.0	89	53	36	.....	.....	15	S. W.	35	.....
1854...	28.957	67.7	89	44	45	.....	.....	11	S. E.	25	.....
1855...	28.927	64.0	88	43	45	[6.44]	[62]	[10]	N. W.	35	.....
1856...	28.950	74.0	96	53	43	3.25	.....	.....	S. W.	.....	.....
1857...	28.846	64.6	85	45	39	2.67	63	4	S.	25	.....
1858...	28.956	70.1	89	49	40	4.72	68	14	S. E.	25	.....
1859...	29.040	64.3	84	39	45	3.33	60	9	S.	25	.....
1860...	.....	67.6	81	52	29	[6.37]	65	[6]	N.	60	.....
1861...	28.953	69.1	85	53	32	.....	.....	4	N. W.	35	.....
1863...	29.113	65.0	87	53	34	.....	.....	.....	N. W.	35	.....
1869...	28.868	62.5	79	49	30	6.24	74	10	S. W.	25	.....
1870...	28.911	72.2	98	53	45	1.92	57	7	N. W.	25	.....
1871...	28.900	69.3	89	54	35	4.93	62	11	W.	35	.....
1872...	28.858	67.0	90	55	35	2.44	64	8	S.	12	.....
1873...	28.862	73.0	89	55	34	5.60	68	9	S. W.	25	.....
1874...	28.878	63.3	92	54	38	2.85	78	9	S. W.	35	.....
1875...	28.793	64.1	80	51	29	3.37	75	7	S. E.	12	.....
1876...	28.801	68.2	87	42	45	4.57	77	7	S. W.	12	.....
1877...	28.866	65.9	83	47	36	4.77	79	7	S.	12	.....
1878...	.....	65.8	86	48	38	4.20	69	8	N.	35	.....
1879...	28.972	67.4	86	42	44	2.80	70	10	S.	22	6,030
1880...	28.938	69.6	87	50	37	9.31	71	16	S. W.	50	6,077
1881...	28.911	66.4	90	49	41	4.15	75	11	E.	36	6,227
1882...	28.889	64.5	87	42	45	7.76	73	17	E.	48	6,412
1883...	28.872	65.2	86	47	39	7.57	84	15	N.	.....	.....
1884...	29.031	66.6	85	47	38	5.47	80	10	S.	36	6,131
1885...	28.987	65.2	84	42	42	5.11	73	13	S. W.	45	7,035
Means.	28.918	67.1	86.4	45.6	40.8	4.79	70.3	10.1	S. W.	39.5	6,319

OBSERVATIONS FOR JULY.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.).	Monthly movement of wind (miles).
1853...	29.059	67.8	81	57	24	.....	6	S. W.	15	.....
1856...	29.030	75.8	97	65	32	2.80	58	S. W.	.....	.....
1857...	29.036	75.1	95	60	35	[3.00]	61	S.	25	.....
1858...	29.030	72.1	85	60	25	2.35	64	N. E.	25	.....
1859...	29.060	75.8	93	51	42	2.41	63	S.	35	.....
1869...	28.951	69.0	84	59	26	3.63	73	N. W.	45	.....
1870...	28.888	73.8	91	58	33	5.25	64	S. W.	35	.....
1871...	28.928	71.1	90	56	34	2.11	59	W.	35	.....
1872...	28.892	73.4	92	60	32	1.26	65	S. W.	25	.....
1873...	28.928	71.7	91	53	38	0.82	68	S. W.	12	.....
1874...	28.967	75.4	96	63	34	5.19	63	S. W.	25	.....
1875...	28.955	73.0	86	62	24	0.97	71	S. E.	25	.....
1876...	28.930	74.5	89	61	28	4.14	70	S.	25	.....
1877...	28.921	73.0	88	61	27	3.84	73	N. W.	12	.....
1878...	.....	74.9	92	61	31	7.56	74	S. E.	12	.....
1879...	28.946	74.3	91	55	36	5.91	71	S. W.	32	5,449	
1880...	28.981	71.9	93	53	40	6.00	72	N. W.	25	5,343	
1881...	29.016	73.1	92	56	36	9.47	75	N.	32	5,321	
1882...	29.014	66.8	87	50	37	2.70	74	N. W.	22	5,884	
1883...	28.928	70.2	89	53	37	8.89	80	S. W.	.....	.....
1884...	28.907	67.7	85	52	33	8.44	74	N. W.	78	6,344	
1885...	28.941	75.2	90	52	38	7.30	76	S. W.	72	7,152	
Means.	28.970	72.5	89.6	52.9	36.7	4.55	69.0	8.6	S. W.	43.5	5,915

OBSERVATIONS FOR AUGUST.

Year.	Mean monthly bar- ometer (inches) at 32° F.	Mean monthly tem- perature.	Maximum tempera- ture.	Minimum tempera- ture.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative hu- midity (per cent.).	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.).	Monthly movement of wind (miles).
1853...	28.989	70.3	90	48	42	.....	....	5	S. W.	25	.....
1856...	29.050	70.0	93	59	34	1.58	53	....	W.	.....	.....
1857...	29.094	69.5	89	57	32	2.00	59	4	N. W.	25	.....
1860...	.....	67.5	84	55	29	.....	....	[4]	N. W.	45	.....
1869...	29.014	66.9	89	54	35	5.92	79	9	N. W.	25	.....
1870...	28.926	67.1	89	56	33	3.65	65	10	S.	25	.....
1871...	28.915	69.8	91	52	39	3.35	68	9	N. W.	35	.....
1872...	28.949	70.4	90	53	37	2.24	67	7	S. W.	25	.....
1873...	28.957	71.9	91	58	33	2.76	69	5	S. W.	35	.....
1874...	28.970	71.1	93	58	35	1.40	65	6	N. E.	12	.....
1875...	28.947	69.6	86	52	34	2.57	71	6	S.	25	.....
1876...	28.960	73.1	90	56	34	3.42	72	6	S.	25	.....
1877...	.....	67.8	86	59	27	3.76	69	10	N. W.	25	.....
1878...	.....	72.2	86	59	27	4.28	71	10	N. W.	25	.....
1879...	28.953	70.6	90	47	43	0.99	67	8	S.	40	6,054
1880...	29.012	71.0	92	52	40	5.90	74	13	S.	30	5,691
1881...	29.041	73.2	95	52	43	0.56	69	8	S.	32	5,499
1882...	29.006	69.1	87	50	37	6.83	81	15	N.	35	5,502
1883...	29.027	66.1	86	51	35	2.74	78	5	S. W.	36	5,458
1884...	29.009	66.6	85	49	36	4.39	77	14	S.	60	7,157
1885...	28.967	64.2	82	46	36	6.41	78	11	S.	36	6,980
Means.	28.988	69.6	88.1	49.4	38.7	3.41	70.1	8.4	S.	35.6	6,049

OBSERVATIONS FOR SEPTEMBER.

Year.	Mean monthly barometer, (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. of days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.)	Monthly movement of wind (miles).
1853...	29.020	61.4	87	38	49	.....	.....	10	S. W.	45	.....
1854...	29.158	64.9	93	42	51	.....	.....	4	S.	25	.....
1857...	29.074	62.9	84	41	43	2.93	62	3	S.	25	.....
1859...	.....	.....	.....	.....	.....	2.00	.....	.....	.....	.....	.....
1860...	.....	58.5	83	41	42	3.33	73	7	S. E.	35	.....
1861...	29.015	60.0	88	40	48	2.77	.....	9	S. W.	25	.....
1863...	29.064	59.3	84	34	50	.....	.....	.....	S.	35	.....
1869...	29.033	61.8	79	40	39	2.63	73	6	S.	25	.....
1870...	29.030	61.2	83	54	29	4.00	54	11	N. E.	12	.....
1871...	29.045	59.8	88	40	48	0.47	56	4	N. W.	12	.....
1872...	28.854	62.1	89	39	50	5.11	71	10	S. W.	25	.....
1873...	28.930	55.4	87	40	47	2.54	67	7	N. W.	25	.....
1874...	28.961	64.4	90	46	44	5.46	73	13	S. W.	25	.....
1875...	29.009	58.9	81	36	45	2.06	66	14	S.	25	.....
1876...	28.835	59.8	79	36	43	3.41	77	8	N. W.	35	.....
1877...	.....	65.8	86	47	39	0.64	71	4	S. W.	12	.....
1878...	.....	62.9	85	42	43	6.54	70	7	S.	45	.....
1879...	29.033	62.0	78	37	41	2.68	73	5	S.	30	7,284
1880...	29.013	60.6	85	40	45	4.44	71	11	S.	30	6,185
1881...	28.908	64.8	92	46	46	8.17	77	16	S.	45	6,864
1882...	29.081	61.5	85	43	42	1.91	79	7	E.	23	5,266
1883...	29.058	56.6	79	38	41	2.39	76	6	S.	36	6,443
1884...	28.975	65.1	86	47	39	4.25	79	11	S.	54	8,412
1885...	28.996	59.9	79	42	37	4.05	76	7	S.	32	7,444
Means.	29.004	61.3	83.4	41.9	41.5	3.43	70.7	8.1	S.	35.7	6,843

OBSERVATIONS FOR OCTOBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.).	No. days on which snow or rain fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.).	Monthly movement of wind (miles).
1853...	29.042	46.6	68	21	47	.....	.....	5	S. E.	35	.....
1854...	29.045	54.1	80	23	57	.....	.....	2	S.	25	.....
1857...	29.093	46.8	72	27	45	2.00	76	5	N. W.	60	.....
1858...	29.050	47.7	74	35	39	1.74	71	9	S. W.	35	.....
1859...	.....	46.8	79	22	57	.....	.....	6	N., S.	35	.....
1860...	29.041	49.9	75	33	42	2.23	.....	9	N. W.	60	.....
1861...	28.959	49.0	74	30	44	.....	.....	6	S.	25	.....
1862...	28.976	50.0	82	22	60	.....	.....	.....	S.	45	.....
1863...	29.028	40.7	65	29	36	3.25	.....	5	S.	60	.....
1869...	28.954	37.7	71	19	52	6.60	65	7	N. W.	25	.....
1870...	28.956	50.4	70	29	41	2.09	75	9	W.	35	.....
1871...	28.885	52.0	80	27	53	3.07	68	8	W.	25	.....
1872...	28.971	49.0	76	30	46	0.60	61	6	N. W.	25	.....
1873...	28.914	45.1	73	20	53	1.96	68	8	S. W.	25	.....
1874...	28.848	51.0	71	30	41	1.44	76	6	S. E.	12	.....
1875...	28.930	46.1	77	27	50	1.96	63	10	S. W.	12	.....
1876...	28.853	45.8	66	23	43	1.59	74	3	S. W.	25	.....
1877...	.....	51.2	78	33	45	4.12	75	13	S. W.	12	.....
1878...	28.959	49.6	74	20	54	3.78	68	15	N. W.	50	8,519
1879...	29.069	58.0	84	24	60	2.50	67	8	S.	30	7,787
1880...	29.011	48.5	75	26	49	1.68	67	6	S. E.	44	8,069
1881...	29.041	51.6	77	33	44	9.12	60	20	S. E.	24	7,044
1882...	28.975	54.4	78	35	43	4.14	77	8	S.	32	6,456
1883...	29.081	46.3	79	28	51	3.79	80	11	S. E.	48	8,372
1884...	29.063	51.5	80	26	54	4.60	78	9	S.	54	9,196
1885...	28.972	44.8	71	26	45	2.37	77	7	S.	40	8,339
Means.	28.988	48.4	77.3	27.8	50.0	3.08	71.8	8.2	S.	40.2	7,973

OBSERVATIONS FOR NOVEMBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.).	Monthly movement of wind (miles).
1853...	29.110	38.8	56	14	42	.....	.....	13	N. W.	25	.....
1854...	28.860	37.0	65	17	48	.....	.....	5	N. W.	25	.....
1856...	28.950	33.1	52	13	39	4.92	71	.....	S.	.....	.....
1857...	28.888	29.3	57	- 3	60	0.72	71	3	S. W.	61	.....
1858...	29.020	31.7	49	7	42	1.37	86	13	N. W.	35	.....
1859...	.....	36.4	68	19	49	1.39	.....	7	N. S.	25	.....
1860...	28.910	33.3	63	- 4	67	1.32	.....	9	W.	25	.....
1861...	28.884	37.2	52	23	29	.....	.....	.....	S. W.	25	.....
1862...	29.041	33.3	52	21	31	.....	.....	.....	S.	45	.....
1863...	28.967	35.4	56	8	48	2.50	.....	4	N. W.	45	.....
1869...	28.862	30.6	60	14	46	2.05	82	10	N. W.	35	.....
1870...	28.924	38.6	64	19	45	0.53	67	5	N. W.	35	.....
1871...	28.965	30.9	58	3	55	2.31	74	6	N. E.	25	.....
1872...	28.900	27.2	54	- 4	58	0.76	85	3	N. W.	25	.....
1873...	28.886	28.2	50	2	48	2.15	85	7	N. W.	25	.....
1874...	28.970	32.6	69	- 3	72	3.29	77	9	W.	25	.....
1875...	28.987	31.0	54	-11	65	0.40	81	6	N.	12	.....
1876...	28.926	34.8	63	14	49	2.31	84	5	N. W.	12	.....
1877...	.....	34.7	47	11	36	2.81	77	11	S. W.	12	.....
1878...	28.968	40.0	58	24	34	0.76	70	6	N. W.	25	6,722
1879...	28.994	33.7	67	11	56	6.02	73	10	S.	40	7,909
1880...	29.084	26.8	60	- 7	67	1.68	72	12	W.	29	7,915
1881...	28.990	34.6	59	6	53	2.56	76	18	W.	32	9,884
1882...	29.087	38.3	66	17	49	2.62	82	11	S.	28	6,894
1883...	28.996	34.5	60	2	58	2.56	77	8	S.	60	10,547
1884...	29.038	32.2	60	- 5	65	1.53	82	11	N. W.	32	7,030
1885...	28.924	35.6	55	22	33	2.74	85	4	N. W.	36	7,071
Means.	28.965	33.7	60.9	8.8	52.1	2.14	77.7	8.1	N. W.	35.2	8,121

OBSERVATIONS FOR DECEMBER.

Year.	Mean monthly barometer (inches) at 32° F.	Mean monthly temperature.	Maximum temperature.	Minimum temperature.	Monthly range of temperature.	Rain or melted snow (inches).	Mean relative humidity (per cent.)	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind (miles per hr.)	Monthly movement of wind (miles).
1853...	28.946	26.0	48	1	47	.....	60	[5]	N. W.	25	.....
1856...	29.038	13.0	35	-10	45	[3.25]	84	[3]	W.	45	.....
1857...	29.021	30.8	48	17	31	0.75	84	4	S. W.	25	.....
1858...	29.016	22.5	40	-11	51	.....	82	3	S. W.	33	.....
1860...	29.054	19.0	35	-6	41	1.00	91	5	N. W.	25	.....
1861...	29.194	25.5	49	2	47	[0.50]	.....	[3]	S. W.	25	.....
1862...	29.025	27.3	46	5	41	.....	.....	.....	S. W.	25	.....
1863...	28.994	21.5	39	-15	54	1.70	.....	6	N. W.	35	.....
1869...	28.993	22.3	39	-2	41	2.64	89	7	W.	25	.....
1870...	28.910	22.1	48	-13	61	0.67	87	7	W.	35	.....
1871...	28.926	13.4	39	-15	53	1.15	87	10	W.	12	.....
1872...	29.043	9.5	38	-28	66	1.60	96	8	N. W.	35	.....
1873...	28.998	26.0	43	2	41	1.80	88	8	S. E.	25	.....
1874...	28.977	22.6	50	-15	65	0.45	84	6	N. W.	12	.....
1875...	28.790	31.9	54	-11	65	2.18	87	8	N. W.	12	.....
1876...	29.064	11.1	41	-22	63	2.59	70	6	N. W.	25	.....
1877...	.....	38.7	57	23	34	2.01	80	8	S. W.	12	.....
1878...	28.965	22.0	39	-8	47	0.79	66	8	W.	29	7,891
1879...	29.005	21.1	54	-12	66	2.29	74	15	W.	30	7,873
1880...	29.036	17.0	40	-21	61	1.17	75	19	W.	32	7,402
1881...	29.036	33.1	49	6	43	1.32	74	14	S.	40	8,330
1882...	29.025	21.7	43	-13	56	2.03	78	20	N. W.	38	6,853
1883...	29.009	22.3	51	-11	62	1.95	82	9	N. W.	40	8,934
1884...	29.032	16.8	43	-20	63	5.68	85	17	N.	40	7,633
1885...	28.979	23.7	51	-13	64	3.59	87	10	N. W.	60	8,822
Means.	29.003	22.4	46.2	-11.6	57.8	1.87	81.1	9.4	N. W.	38.6	7,967

REMARKS TO ACCOMPANY TABLE I.

January; 1857, 23 days observations only.

January; 1860, 20 days observations only.

March; 1862, 27 days observations only.

March; 1863, 26 days observations only.

April; 1863, no observations.

May; 1864, 16 days observations only.

May; 1863, 26 days observations only for the barometer, mean temperature and rainfall; and 21 days only for the maximum and minimum temperature.

June; 1855, 19 days observations for barometer, and 23 days for the other entries.

June; 1860, 26 days observations only.

June; 1863, 25 days observations only.

July; 1857, 20 days observations only.

August; 1860, 23 days observations only.

November; 1861, 26 days observations only.

November; 1863, 24 days observations for barometer.

December; 1856, 23 days observations only.

December; 1861, 20 days observations only.

December, 1853, 23 days observations only.

In all cases where the observations were given for a portion only of the month, the rainfall, No. of days of rain or snow, and the movement of wind have been omitted from the means and sums.

The mean barometer, temperature, rainfall, relative humidity, No. of days of snow or rain, and prevailing winds are derived from the whole series 1853-1885.

The mean highest temperature, the lowest, the range, the mean maximum velocity of the wind, and the monthly movements of the wind are derived from the data of the years 1870-1885 only, for reasons previously given.

TABLE II. — SUMMARY OF METEOROLOGICAL OBSERVATIONS
FROM 1869 TO 1885, INCLUSIVE, BY YEARS.

N. B.—See remarks at end of the table.

YEAR.	Mean yearly barometer. (Inches.)	Mean yearly temperature.	Highest temperature of the year.	Lowest temperature of the year.	Range of temperature for the year.	Rain or melted snow. (Inches.)	Mean relative humidity. Per cent.	No. days on which rain or snow fell.	Prevailing wind.	Maximum velocity of wind. (Miles per hour.)	Yearly movement of wind. (Miles.)
1869	28.966	42.9	89	-11	100	43.27	79.2	103	N. W.	45	.....
1870	28.920	47.2	98	-13	111	27.83	69.5	93	N. W.	35	.....
1871	28.903	46.1	91	-15	106	29.51	70.7	103	W.	35	.....
1872	28.897	44.4	92	-28	120	22.44	73.9	87	{ S. W. N. W.	35	.....
1873	28.893	43.8	91	-21	112	26.49	76.5	80	{ S. W. N. W.	35	.....
1874	28.950	45.5	96	-15	111	29.02	74.1	85	S. W.	35	.....
1875	28.917	42.4	86	-25	111	22.59	74.2	100	{ S. W. W.	25	.....
1876	28.921	46.1	90	-22	112	36.04	78.3	93	{ S. W. N. W.	35	.....
1877	.....	47.7	88	-16	104	27.67	77.3	84	S. W.	25	.....
1878	.....	49.7	92	-9	101	39.54	71.7	104	N. W.	50	[23, 132]
1879	28.993	47.9	91	-22	113	35.10	68.7	103	S.	48	87, 425
1880	28.939	48.1	93	-21	114	46.72	70.0	138	{ S. W. N. W.	50	90, 855
1881	29.001	46.9	95	-20	115	52.92	72.4	158	{ S. W. N. W.	45	84, 342
1882	29.005	47.1	87	-13	100	42.89	75.3	160	{ N. W. S.	48	85, 448
1883	29.006	42.3	89	-23	112	39.84	77.9	121	{ N. W. S.	60	[60, 138]
1884	28.992	43.4	86	-27	113	49.19	77.8	144	S.	78	93, 983
1885	28.969	42.1	90	-25	115	40.58	77.2	114	N. W.	72	93, 120
Means .	28.955	45.5	90.0	-21.6	111.6	35.98	74.4	110	.....	57.3	89, 196

REMARKS.—For 1878, the maximum velocity of the wind and the No. of miles traveled were observed for October, November, December, only.

For 1883, the same data are for 233 days only; the maximum and minimum Thermometer and Range of Temperature for 323 days. The other data for 328 days.

The mean Barometer, temperature, rainfall, humidity, No. of days on which snow or rain fell, are given from all the data 1869-1885. The mean highest and lowest temperature, the range, and the maximum velocity and number of miles traveled by the wind, relate only to the years 1879-1885.

TABLE III—SUMMARY OF THE PRECEDING METEOROLOGICAL OBSERVATIONS BY MONTHS.

Month.	Mean monthly barometer (inches), 1873-1885.	Mean monthly temperature, 1853-1885.	Mean maximum temperature, 1873-1885.	Mean minimum temperature, 1873-1885.	Mean monthly range of temperature, 1873-1885.	Mean monthly fall of rain or melted snow (inches), 1853-1885.	Mean relative humidity (per cent), 1853-1885.	Mean number of days on which rain or snow fell, 1853-1885.	Mean direction of wind, 1853-1885.	Mean maximum velocity of wind (miles per hour), 1873-1885.	Mean monthly movement of the wind (miles), 1873-1885.
January.....	29.009	18.0	43.4	-17.0	60.4	1.69	81.3	8.6	S. W.	33.0	7,663
February.....	28.990	21.5	47.9	-9.1	57.0	1.65	81.1	7.5	N. W.	34.1	7,539
March.....	28.920	30.7	57.9	+1.7	56.2	2.05	72.3	8.0	N. W.	39.4	8,820
April.....	28.921	44.4	76.9	19.0	57.9	2.41	67.0	8.7	S.	41.0	8,364
May.....	28.923	57.9	83.0	40.5	42.5	3.68	64.2	10.0	S., N. E.	34.3	7,461
June.....	28.918	67.1	86.4	45.6	40.8	4.79	70.3	10.1	S. W.	39.5	6,319
July.....	28.970	72.5	89.6	52.3	36.7	4.55	69.0	8.6	S. W.	43.5	5,915
August.....	28.988	69.6	88.1	49.4	38.7	3.41	70.1	8.4	S.	35.6	6,049
September.....	29.004	61.3	83.4	41.9	41.5	3.43	70.7	8.1	S.	35.7	6,843
October.....	28.988	48.4	77.3	27.3	50.0	3.03	71.8	8.2	S.	40.2	7,973
November.....	28.965	33.7	60.9	8.8	52.1	2.14	77.7	8.1	N. W.	35.2	8,121
December.....	29.003	22.4	46.2	-11.6	57.8	1.87	81.1	9.4	N. W.	38.6	7,967
Means.....	28.969	45.6	.....	.....	49.3	2.90	73.9	8.6	S.	37.5	7,420
Sums.....	.....	.....	.....	.....	.....	34.75	.....	103.7	.....	.....	89,034

TABLE IV.—DATES OF OPENING AND CLOSING OF THE LAKES
AT MADISON, 1855-1886.

YEAR.	MONONA.		MENDOTA.
	Opened.	Closed.	Opened.
1856.	April 7.	December 4.	
1857	May 4.	November 17.	
1858	March 26.	December 11.	
1859	March 15.	December 6.	March 14.
1860	March 18.	December 5.	March 18.
1861	April 10.	December 1.	April 10.
1862	April 13.	November 7.	April 14.
1863	April 1.	December 7.	April 16.
1864	April 20.	December 9.	April 21.
1865	April 5.	December 14.	April 5.
1866	April 18.	December 12.	April 18.
1867	April 19.	December 14.	April 20.
1868	March 31.	December 10.	March 31.
1869	April 15.	November 24.	April 16.
1870	April 11.	December 22.	April 12.
1871	April 1.	November 30.	April 1.
1872	April 20.	November 28.	April 20.
1873	April 17.	November 29.	April 18.
1874	April 14.	December 12.	April 14.
1875	April 14.	January 10, 1876	April 15.
1876	April 10.	December 5.	April 10.
1877	April 15.	January 7, 1878	April 15.
1878	March 10.	December 16.	March 9.
1879	April 10.	December 16.	April 12.
1880	March 18.	November 22.	March 25.
1881	May 1.	January 1, 1882	May 3.
1882	March 19.	December 7.	March 21.
1883	April 13.	December 17.	April 13.
1884	April 15.	December 17.	April 15.
1885	April 17.	December 7.	April 20.

APPENDIX.

SOME OBSERVATIONS OF THE 203 STARS BETWEEN
5^h AND 12^h OF RIGHT ASCENSION.

INTRODUCTION.

When Professor HOLDEN completed his observing on the list of 303 stars in October, 1885, the work was finished, excepting that part of the list between 5^h and 12^h of Right Ascension — see page 3, of this volume. The completion of this part of the work devolved upon the assistants in the observatory. By observing during the early morning hours the work was finished on December 25, 1885. The weather was unusually mild for this season of the year, and all the observations were made at temperatures ranging from $+20^\circ$ to $+35^\circ$ Fahr. The atmospheric conditions were fairly good, the seeing being usually marked 3 on a scale of 5. The observation of faint stars was sometimes rendered impossible by haze. In a few cases where two stars culminated too closely for both to be observed on the same night, it was found impracticable to get more than eight or ten observations of each.

The pointings of the telescope were made by Mr. M. UPDEGRAFF and the microscopes were read during the greater part of the time by Miss A. M. LAMB. For a few nights the microscopes were read by Mr. G. W. BROWN. A complete determination of the constants of the instrument were made for each night's work, the collimation being usually checked by nadir observations. The nadir point was observed for latitude before and after each night's work.

The observations in Right Ascension were reduced by MAYER's formula. The reductions in Right Ascension and Declination were made by Mr. UPDEGRAFF excepting a few nights in Declination which were reduced by Miss LAMB. The reductions to 1885.0 were made by Professor BIGELOW, of Racine College.

The probable errors of one ΔT and of one equator point are as follows:

$$\begin{array}{l} \text{P.E. } 1 \Delta T = \pm 0.^s 027 \text{ } 141 \text{ stars} \\ \text{P.E. } 1 \text{ Eq. Pt.} = \pm 0.^s 96 \text{ } 163 \text{ stars} \end{array} \left. \vphantom{\begin{array}{l} \text{P.E. } 1 \Delta T = \pm 0.^s 027 \text{ } 141 \text{ stars} \\ \text{P.E. } 1 \text{ Eq. Pt.} = \pm 0.^s 96 \text{ } 163 \text{ stars} \end{array}} \right\} \text{M. U. observer.}$$

The whole number of observations made is 691; 563 being observations of the 303 stars and 128 of polars and other stars from the B. J.

The following table is a summary of the work done on the meridian circle from May 2, 1884, to January 1, 1886:

Stars of the 303 List	3,966
Other stars from the B. J.	1,722
Stars observed for Refraction.....	217
Stars of the Latitude List.....	240
Miscellaneous stars (including <i>Polaris</i> for Latitude).....	299
Total	6,444

Observers E. S. H., G. C. C. and M. U.

In the above enumeration each observation in Right Ascension and each observation in Declination is counted once.

Besides observations of the 303 stars between 5^h and 12^h of Right Ascension, this appendix contains a record of the constants and of the nadir point of the meridian circle from Nov. 1, 1885 to Jan. 1, 1886, the results of observations through screens by M. U. and flexure observations by M. U. and A. M. L.

MILTON UPDEGRAFF.
ALICE M. LAMB.

OBSERVATIONS THROUGH SCREENS.

The screen observations were made in January 1886, by Mr. UPDEGRAFF. The seeing was rather poor for the greater part of the time, and a considerable number of the observations were made at a temperature of -12° F. The screens used are those referred to on page 48. The circle remained East during the whole series, about half the observations being with screens on during the first half and the remainder with screens on during the latter half of the star's transit. The illumination of the field was adjusted for the bright and faint transits. The reduction of magnitude by screens much below that of the faintest stars on the 303 list was avoided. Very few stars were reduced below 7.5 and none lower than the 8th magnitude. 124 observations were made with one screen; 74 with two screens; and 12 with three screens;—210 in all.

The results of observations with one screen are as follows:

	Faint before Bright.	Faint after Bright.
Faint—Bright	$+0.^{\circ} 019 \pm 0.^{\circ} 006$ (57 obs.)	$+0.^{\circ} 018 \pm 0.^{\circ} 004$ (67 obs.)

The means of the 124 observations gives as the effect of one screen,

$$+0.^{\circ} 018 \pm 0.^{\circ} 004.$$

The reduced magnitudes varied from 6.0 to 7.5.

For two screens—

Reduced Mag.	Faint before Bright.	Faint after Bright.
Faint } 6.0 to 7.0.	$+0.^{\circ} 067 \pm 0.^{\circ} 011$ (19 obs.)	$+0.^{\circ} 051 \pm 0.^{\circ} 008$ (15 obs.)
minus		
Bright } 7.1 to 8.0.	$+0.^{\circ} 028 \pm 0.^{\circ} 011$ (19 obs.)	$+0.^{\circ} 025 \pm 0.^{\circ} 010$ (21 obs.)

The mean of the 74 observations gives as the effect of two screens,

$$+0.^{\circ} 042 \pm 0.^{\circ} 005.$$

The mean of 12 observations with 3 screens—6 faint star first and 6 faint star last, gives as the effect of 3 screens,

$$+0.^{\circ} 083 \pm 0.^{\circ} 019$$

OBSERVATIONS FOR HORIZONTAL FLEXURE.

The flexure observations by G. C. U. and A. M. L., on pp. 45 and 46 of this volume, were all taken with the North Collimator micrometer head up—the wires of the South Collimator remaining fixed and the settings being made at the North Collimator. A series of 12 observations of the flexure has been made by M. U. with N. C. mic. head up, and also a series of 12 with N. C. mic. head down.

HORIZONTAL FLEXURE; M. U., OBSERVER.

Circle East.

DATE; 1886.	Temp.	N. C. Microme- ter head.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
January 2.....	35	Up.	+0.56	+0.50
January 3.....	36	Up.	+0.82	+0.84
January 3.....	36	Up.	+0.50	+0.34
January 3.....	37	Up.	+0.65	+0.46
January 4.....	33	Up.	+0.31	+0.23
January 4.....	34	Up.	+0.40	+0.21
January 15.....	28	Down.	+0.37	+0.44
January 15.....	28	Down.	+0.69	+0.48
January 15.....	26	Down.	+0.45	+0.26
January 15.....	26	Down.	+0.46	+0.45
January 16.....	24	Down.	+0.85	+0.76
January 16.....	24	Down.	+0.96	+0.92
Sums			+7.02	+5.89
Mean.....			+0.54 ± 0.03	

24 observations.

WASHBURN OBSERVATORY.

7*

These observations may be classified as follows:

	N. C. Mic. head up.	N. C. Mic. head down.
Telescope turned through Zenith.	$+0''.54 \pm 0''.04$	$+0''.63 \pm 0''.07$
Telescope turned through Nadir.	$+0.43 \pm 0.06$	$+0.55 \pm 0.07$

All these measures were taken during cloudy weather and in no case did the temperature in the different parts of the observing room differ more than 1° F. Miss Lamb has also made an additional series which is given below:

HORIZONTAL FLEXURE; A. M. L., OBSERVER.

Circle East.

Date, 1886.	Temp.	N. C. Micrometer head.	h; Telescope turned through Zenith.	h; Telescope turned through Nadir.
January 7.....	21	Up	+0.12	+0.51
January 15.....	27	Down	+0.50	+0.52
January 15.....	27	Down	+0.42	+0.31
January 15.....	28	Down	+0.54	+0.32
January 16.....	24	Down	+1.09	+1.37
January 16.....	25	Down	+0.64	+0.68
Sums			+3.31	+3.71
Mean			$+0.58 \pm 0.07$	

12 observations.

The following are the results of Miss Lamb's two series made in 1885 and 1886:

	N. C. Mic. head up.	N. C. Mic. head down.
Telescope turned through Zenith,	+0.85 ±0.09	+0.64 ±0.08
Telescope turned through Nadir,	+0.39 ±0.07	+0.64 ±0.15

It should be noticed that Miss Lamb's observations, N. C. mic. head up (with the exception of those of January 7), were taken at a much higher temperature than those N. C. mic. head down.

NADIR POINT FROM NOV. 1, 1885, TO JAN. 1, 1886.

Date.	Sid. Time.	Circle	Temp.	Observer.	Nadir Point.	Remarks.
1885. Nov. 4	h. 20.	W	° ...	.....	° ' " 125 27	Microscope bearer wrapped in listing.
4	5.0	W	33	U	30.92	
4	7.7	W	36	U	31.08	
9	4.9	W	38	U	31.08	
9	8.3	W	35	U	30.87	
15	5.0	W	30	U	28.55	
15	8.4	W	28	U	30.31	
15	16.			Circle	reversed.	
16	5.1	E	37	U	125 32 55.82	
16	8.4	E	.....	U	55.03	
20	5.2	E	36	U	53.73	
20	8.2	E	32	U	54.28	
Dec. 1	9.5	E	36	U	54.98	
1	12.0	E	32	U	53.11	
2	7.5	E	37	U	54.97	
2	11.8	E	32	U	55.16	
2	15.			Circle	reversed.	
18	7.6	W	32	U	125 27 4.36	
18	11.2	W	24	U	4.59	
19	9.3	W	23	U	4.95	
19	11.3	W	25	U	6.19	
19	15.5			Circle	reversed.	
25	9.7	E	25	U	125 32 56.67	
25	11.5	E	24	U	55.98	

RECORD OF CONSTANTS FROM NOVEMBER 1, 1885 TO JANUARY 1, 1886.

N. B.—The column *c* gives the setting of the R. A. Micrometer for $c=0$. The values of *a* have been derived from time observations.

Date.	Sid. Hour.	<i>a</i> .	<i>b</i> .	<i>c</i> .	Setting of N. C. S. on S.	<i>c</i> from Nadir.	Circle.	Observer.	Remarks.
1885.		s.	s.			s.			
Nov. 3	20.2	.....	-0.272	.....	.....	.....	W.	U.	
3	22.0	.....	.....	.394	.706	.....	W.	U.	
4	0.5	.....	.....	.399	.715	+0.030	W.	U.	
4	20.0	+0.30	-0.355	.....	.....	.....	W.	U.	
4	5.1	.....	-0.348	.....	.....	.....	W.	U.	
4	8.0	.....	-0.315	.....	.....	.....	W.	U.	
9	23.	.....	-0.357	.403	.717	.....	W.	U.	
9	5.0	+0.08	-0.314	.....	.....	+0.026	W.	U.	
9	7.2	.....	-0.310	.....	.....	.....	W.	U.	
9	8.4	.....	-0.314	.....	.....	.....	W.	U.	
13	2.	.....	.....	.397	.701	.....	W.	U.	
15	21.	-0.21	-0.329	.400	.703	.....	W.	U.	
15	5.1	.....	-0.305	.....	.....	+0.060	W.	U.	
15	7.1	.....	-0.248	.....	.....	.....	W.	U.	
15	8.5	.....	-0.256	.....	.....	.....	W.	U.	
16	23.	-0.083	.....	.398	.706	.....	E.	U.	
16	5.2	.....	-0.411	.....	.....	.....	E.	U.	
16	7.2	.....	-0.388	.....	.....	.....	E.	U.	
16	8.5	.....	-0.442	.....	.....	-0.033	E.	U.	
19	22.	.....	.....	.399	.717	.....	E.	U.	
20	21.0	+0.23	-0.457	.394	.710	.....	E.	U.	
20	5.0	.....	-0.379	.....	.....	+0.051	E.	U.	
20	6.6	.....	-0.377	.....	.....	.....	E.	U.	
20	8.3	.....	-0.363	.....	.....	.....	E.	U.	

RECORD OF CONSTANTS.

DATE.	Sid. Hour.	a.	b.	c.	Setting of N. C. C. on S. C.	c from Nadir.	Circle	Observer.	Remarks.
1885.		s.	s.			s.			
Nov. 24	2.8	-0.11	-0.419	.....	.....	.....	E.	U.	
Dec. 1	9.	.....	.....	.393	.685	.....	E.	U.	
1	10.0	+0.03	-0.436	.....	.....	.....	E.	U.	
1	10.7	.....	-0.382	.....	.....	.....	E.	U.	
1	12.0	.....	-0.374	.....	.....	.....	E.	U.	
2	7.7	.....	-0.477	.....	.....	.....	E.	U.	
2	9.6	+0.050	-0.524	.....	.....	.....	E.	U.	
2	10.7	.....	-0.513	.....	.....	.....	E.	U.	
2	12.0	.....	-0.504	.....	.....	.....	E.	U.	
5	1.	.....	.....	.335	.684	.....	W.	U.	
6	3.7	+0.16	-0.019	.....	.....	.....	W.	U.	
9	4.6	-0.47	-0.356	.390	.709	.....	W.	U.	
11	4.0	.....	.....	.386	.702	.....	W.	U.	
13	9.5	-0.13	-0.557	.389	.704	.....	W.	U.	
17	2.6	-0.16	-0.857	.398	.704	.....	W.	U.	
18	2.8	.....	.....	.399	.710	.....	W.	U.	
18	7.7	-0.140	-0.752	.....	.....	.....	W.	U.	
18	9.7	.....	-0.770	.....	.....	.....	W.	U.	
18	11.5	.....	-0.742	.....	.....	.....	W.	U.	
18	16.5	.....	.....	.396	.692	.....	W.	U.	
19	9.2	-0.324	-0.578	.....	.....	+0.007	W.	U.	
19	11.4	.....	-0.571	.....	.....	.....	W.	U.	
24	4.9	-0.39	-0.520	.391	.701	.....	E.	U.	
25	3.0	.....	.....	.400	.706	.....	E.	U.	
25	9.5	-0.26	-0.499	.....	.....	.....	E.	U.	
25	11.3	.....	-0.473	.....	.....	-0.089	E.	U.	

The following observations of the 303 stars are printed as before, excepting that the column giving the observer is left out, since the observer is always U.

17 *Camelopardalis*,* U. C.

1885.							
Nov. 9	5	19	18.77	+62	58	9.2	W
16			18.44			9.1	E

78. 9 β *Leporis*,*

1885.							
Nov. 9	5	23	19.06	-20	51	7.1	W
16			19.03			7.4	E

Gr. 966,* U. C.

1885.							
Nov. 15	5	24	20.92	+74	57	55.8	W
20			21.14			....	E

74. 11 α *Leporis*,*

1885.							
Nov. 9	5	27	39.55	-17	54	19.8	W
15			39.40			19.7	W
16			39.46			20.3	E
20			39.48			19.8	E

76. 46 ϵ *Orionis*,*

1885.							
Nov. 4	5	30	22.64	-	1	16	35.0
9			22.71				34.9
15			22.71				36.8
16			22.65				35.2
20			22.70				35.0

77. 13 γ *Leporis*,*

1885.							
Nov. 9	5	39	40.09	-22	29	12.5	W
16			40 18			13.2	E

78. 14 ζ *Leporis*,*

1885.							
Nov. 4	5	41	44.78	-14	51	56.6	W
9			44.66			57.2	W
15			44.67			56.4	W
16			44.63			56.6	E
20			44.70			56.6	E

ψ Draconis australis, S. P.*

1885.							
Nov. 4	17	43	59.17	+72	12	19.1	W
16			58.68			....	E

80. 15 δ *Leporis,**

1885.							
Nov. 9	5	46	22.53	—20	53	24.2	W
16			22.61			22.5	E
20			22.57			21.9	E

81. 16 η *Leporis,**

1885.							
Nov. 4	5	51	10.00	—14	11	22.2	W
9			10.05			22.7	W
16			10.01			22.0	E
20			10.08			22.8	E

82. LL 11382.

1885.							
Nov. 4	5	54	18.16	— 3	4	48.7	W
16			18.14			46.7	E
20			18.11			48.2	E

35 *Draconis,* S. P.*

1885.							
Oct. 29	17	54	36.04	+76	58	38.0	W

83. 66 *Orionis,**

1885.							
Oct. 29	5	58	53.78	+ 4	9	50.8	W
Nov. 4			53.82			50.5	W
16			53.78			50.4	E
20			53.72			51.1	E

22 H. *Camelopardalis,* U. C.*

1885.							
Oct. 29	6	6	10.46	+69	21	....	W
Nov. 4			10.46			29.3	W
9			10.40			29.6	W
15			10.55			30.0	W
16			10.41			....	E
20			10.80			30.6	E

84. 5 *Monocerotis.*

1885.							
Oct. 29	6	9	14.82	— 6	14	25.7	W
Nov. 4			14.82			26.3	W
9			14.80			26.6	W
16			14.74			26.0	E
20			14.74			25.9	E

PUBLICATIONS OF THE

85. 6 *Monocerotis*.

1885.							
Oct. 29	6	12	10.72	—10	41	...	W
Nov. 9			10.76			0.9	W
15			10.79			2.0	W
20			10.80			1.0	E

86. 2 β *Canis Majoris*.*

1885.							
Oct. 29	6	17	38.19	-17	53	58.4	W
Nov. 4			38.10			59.3	W
9			38.08			59.3	W
16			38.16			59.6	E
20			38.08			59.4	E

87. 10 *Monocerotis*.*

1885.								
Nov. 4	6	22	16.84	—	4	41	31.6	W
16			16.87				31.3	E
20			16.80				32.1	E

23 H. *Camelopardalis*,* U. C.

1885.							
Oct. 29	6	26	35.33	+79	41	...	W
Nov. 9			35.18			9.0	W
15			35.30			7.6	W
16			35.44			7.9	E
20			35.46			7.8	E

88. 5 ξ^* *Canis Majoris*.*

1885.							
Oct. 29	6	30	14.20	-22	52	28.6	W
Nov. 4			14.19			29.1	W
9			14.16			28.2	W
15			14.22			28.0	W
20			14.16			28.7	E

89. P. VI 203.

1885.							
Oct. 29	6	35	10.77	+ 0	36	5.2	W
Nov. 4			10.67			4.8	W
9			10.66			4.5	W
15			10.78			4.0	E
16			10.70			5.2	E

90. 9 α *Canis Majoris*.*

1885.							
Oct. 29	6	46	4.96	-16	33	35.1	W
Nov. 4			4.89			33.8	W
16			4.87			33.8	E

91. 18 *Monocerotis*.*

1885.							
Oct. 29	6	41	51.85	+ 2	32	13.4	W
Nov. 4			51.88			12.8	W
9			51.83			12.7	W
16			51.84			13.2	E
20			51.86			12.4	E

51 H. *Cephei*,* U. C.

1885.							
Oct. 29	6	46	16.55	+87	13	26.5	W
Nov. 4			16.83			26.2	W
9			16.67			....	W
16			16.90			....	E

92. 14 θ *Canis Majoris*.*

1885.							
Nov. 4	6	48	50.82	-11	53	44.0	W
9			50.79			44.0	W
15			50.80			43.4	W
16			50.76			43.5	E
20			50.83			43.6	E

93. 19 *Canis Majoris*.

1885.							
Oct. 29	6	50	38.20	-19	59	27.4	W
Nov. 4			38.22			....	W
9			38.22			27.6	W
15			38.27			27.3	W
16			38.23			26.8	E
20			38.22			27.6	E

94. P. VI 303.

1885.							
Oct. 29	6	53	53.15	-25	15	32.2	W
Nov. 9			53.14			31.2	W
15			53.20			31.5	W
16			53.21			32.3	E
20			53.13			32.7	E

95. 19 *Monocerotis*.

1885.							
Oct. 29	6	57	12.17	-14	4	24.9	W
Nov. 4			12.29			23.8	W
16			12.16			24.8	E

96. 23 γ *Canis Majoris*.*

1885.							
Nov. 9	6	58	33.32	-15	27	51.5	W
15			33.28			52.1	W
16			33.34			51.7	B
20			33.32			51.4	E

PUBLICATIONS OF THE

97. 20 *Monocerotis*.

1885.							
Oct. 29	7	4	30.91	-4	3	30.7	W
Nov. 4			30.97			30.2	W
9			30.94			31.3	W
16			30.96			31.0	E
20			30.94			31.9	E

98. 29 *Canis Majoris*.

1885.							
Oct. 29	7	13	53.11	-24	29	57.9	W
Nov. 9			53.01			58.7	W
15			53.08			58.5	W
16			53.06			60.1	E
20			53.04			59.6	E

99. P. VII 85.

1885.							
Oct. 29	7	16	31.13	-8	45	45.1	W
Nov. 9			31.18			46.1	W
15			31.14			45.9	W
16			31.21			46.8	E
20			31.25			47.3	E

 γ *Draconis*,* S. P.

1885.							
Nov. 4	19	17	45.56	+73	8	....	W

 β *Canis Minoris*,*

1885.							
Nov. 4	7	20	54.85	+8	31	11.7	W

100. P. VII 116.

1885.							
Oct. 29	7	22	27.31	-11	19	27.0	W
Nov. 9			27.24			27.4	W
15			27.27			28.4	W
16			27.30			28.6	E
20			27.30			26.7	E

101. LL 14810.

1885.							
Oct. 29	7	29	7.80	-22	2	54.6	W
Nov. 9			7.75			54.2	W
15			7.73			53.1	W
16			7.82			54.1	E
20			7.79			53.8	E

102. 25 *Monocerotis*,*

1885.							
Oct. 29	7	31	33.70	-3	51	18.6	W
Nov. 4			33.62			17.8	W
9			33.58			18.2	W
15			33.55			19.1	W
16			33.64			18.2	F
20			33.57			18.3	

1885. 108. 10 α <i>Canis Minoris</i> .*								
Oct. 29	7	33	16.89	+	5	31	...	W
Nov. 4			16.90				7.1	W
9			16.88				7.6	W
15			16.89				8.2	E
16			16.93				7.5	E

1885. 104. 26 <i>Monocerotis</i> .								
Oct. 29	7	35	45.15	—	9	17	0.0	W
Nov. 9			45.14				1.0	W
16			45.13				1.4	E
20			45.20				1.0	E

1885.							
105. 4 <i>Navis</i> .							
Oct. 29	7	40	39.10	—14	17	5.7	W
Nov. 9			39.17			6.1	W
15			39.06			6.1	W
16			39.11			5.7	E
20			39.14			6.0	E

106. 9 <i>Navis med.</i>							
1885.							
Oct. 29	7	46	26.80	—13	35	38.0	W
Nov. 9			26.85			37.2	W
15			26.67			36.9	W
16			26.76			38.0	E
20			26.80			37.5	E

107. 11 e <i>Navis</i> .							
1885.							
Oct. 29	7	51	54.79	—22	34	26.0	W
Nov. 9			54.84			27.0	W
15			54.82			25.7	W
20			54.88			26.8	E

1885. 108. 27 <i>Monocerotis</i> .							
Oct. 29	7	53	59.42	— 3	22	2.0	W
Nov. 9			59.45			1.6	W
15			59.43			1.8	W
16			59.43			1.7	E
20			59.46			1.4	E

<i>x Geminorum.*</i>							
1885.							
Oct. 29	7	56	27.81	+28	6	....	W
Nov. 9			27.24			57.1	W
15			27.28			56.2	W
16			27.23			56.6	E
20			27.25			55.8	E
Dec. 18			27.26			56.6	W

PUBLICATIONS OF THE

109. 15 *i* Navis.*

1885.							
Oct. 29	8	2	38.83	-23	58	25.1	W
Nov. 9			38.81			24.9	W
15			38.83			25.4	W
16			38.73			24.2	E
20			38.80			25.2	E
Dec. 2			38.73			24.9	E
18			38.79			24.9	W

BRADLEY 1147.*

1885.							
Oct. 29	8	5	4.24	+76	6	21.5	W
Nov. 9			4.00			21.2	W
15			4.14			20.8	W
16			3.91			....	E
20			3.96			21.3	E
Dec. 2			3.91			20.9	E
18			4.03			21.0	W

110. 20 Navis.*

1885.							
Oct. 29	8	8	2.76	-15	26	....	W
Nov. 9			2.84			33.8	W
15			2.80			33.2	W
16			2.78			34.1	E
20			2.82			33.4	E
Dec. 2			2.79			33.8	E
18			2.83			32.9	W

K Cephei,* S.P.

1885.							
Oct. 29	20	12	44.53	+77	21	54.2	W
Nov. 16			44.25			....	E

111. LL 16304.

1885.							
Nov. 15	8	12	56.40	-12	14	39.1	W
Dec. 2			56.41			39.7	E
18			56.48			37.8	W

112. BRADLEY 1197.*

1885.							
Dec. 2	8	19	54.80	- 3	31	56.1	E
18			54.80			55.4	W

113. P. VIII 95.

1885.							
Dec. 2	8	26	20.85	-19	11	23.1	E
18			20.87			24.0	W

114. BRADLEY 1212.

1885.							
Dec. 2	8	29	51.48	- 7	35	13.2	E
18			51.47			12.1	W

115. 6 *Hydrae*.

1885.							
Dec. 2	8	34	34.51	-12	4	9.9	E
18			34.57			10.0	W

 δ *Canceri*.*

1885.							
Dec. 2	8	38	8.92	+18	34	34.1	E
18			8.89			34.4	W

116. P. VIII 167.

1885.							
Dec. 2	8	41	25.30	-1	28	34.7	E
18			25.27			34.8	W

118. 15 *Hydrae*.

1885.							
Dec. 2	8	45	55.28	-6	44	49.4	E
18			55.34			49.2	W

76 *Draconis*,* S. P.

1885.							
Dec. 2	20	50	51.06	+82	6	15.2	E
18			50.97			....	W

119. P. VIII 227.

1885.							
Dec. 2	8	53	20.10	-15	41	39.9	E
18			20.17			39.0	W

 σ^2 *Ursae Majoris*,* U. C.

1885.							
Dec. 2	9	0	15.69	+67	36	1.5	E
18			15.75			1.0	W

120. 19 *Hydrae*.

1885.							
Dec. 2	9	3	4.55	-8	7	30.2	E
18			4.48			29.8	W

121. P. IX. 13.

1885.							
Dec. 2	9	6	42.67	-19	16	40.8	E
18			42.71			40.8	W

PUBLICATIONS OF THE

122. 22 θ *Hydrae*.*

1885.							
Dec. 2	9	8	22.81	+ 2	47	56.0	E
18			22.82			56.0	W

123. [LAC. θ *Pyxid. naut.*]

1885.							
Dec. 2	9	16	24.13	-25	28	36.6	E
18			24.12			35.1	W

124. 30 α *Hydrae*.*

1885.							
Dec. 2	9	21	56.15	- 8	9	38.8	E
18			56.13			38.9	W

125. 32 τ^2 *Hydrae*.

1885.							
Dec. 2	9	26	7.16	- 0	40	41.6	E
18			7.14			40.2	W

126. LL 18817.

1885.							
Dec. 2	9	27	54.70	-20	36	25.8	E
18			54.70			26.1	W

127. 38 κ *Hydrae*.

1885.							
Dec. 2	9	34	47.57	-13	48	39.2	E
18			47.55			39.8	W

128. 6 *Sextantis*.*

1885.							
Dec. 1	9	45	26.32	- 3	42	17.4	E
2			26.36			17.2	E
18			26.31			17.5	W
19			26.34			17.2	W
25			26.34			17.8	E

GR. 1586,* U. C.

1885.							
Dec. 1	9	48	4.86	+73	25	....	E
2			4.78			....	E
18			4.75			32.6	W
19			4.70			33.2	W
25			4.51			....	E

129. Ll. 19433.

1885.							
Dec. 1	9	49	26.73	—18	27	52.8	E
2			26.76			53.4	E
19			26.74			53.6	W
25			26.78			52.2	E

130. 12 *Sextantis*.

1885.								
Dec. 1	9	53	45.10	+	3	56	3.0	E
2			45.15				2.3	E
18			45.18				3.1	W

131. 40 v^3 *Hydrae*.

1885.							
Dec. 1	9	59	31.44	—12	30	25.5	E
25			31.51			26.3	E

 α *Leonis*.*

1885.								
Dec.	1	10	2	14.85	+12	31	43.2	E
	2			14.86			43.1	E
	18			14.86			43.8	W
	19			14.84			43.3	W
	25			14.80			43.9	E

132. 41 λ *Hydrae*.*

1885.							
Dec. 1	10	4	58.86	—11	47	9.3	E
2			58.88			9.2	E
18			58.87			10.0	W
19			58.88			10.9	W
25			58.90			10.0	E

24 *Cephei*.* S. P.

1885.								
Dec.	1	22	7	35.74	+71	46	....	E
	2			35.58			....	E
	18			35.82			....	W
	19			35.69			....	W
	25			35.49			....	E

133. 22 *Sextantis*.

1885.									
Dec.	1	10	11	54.86	—	7	29	42.4	E
	2			54.96				42.4	E
	18			54.90				41.5	W
	19			54.96				41.9	E
	25			54.96				42.6	E

30 H. *Ursae Majoris*,* U. C.

1885.						
Dec.	1	10 15	49.70	+66	8	.... E
	2		49.70			.... E
	18		49.63			51.3 W
	19		49.69			52.1 W
	25		49.58			50.7 E

134. 25 *Sextantis*.

1885.						
Dec.	1	10 17	37.68	— 3	29	35.8 E
	2		37.75			35.4 E
	18		37.70			35.0 W
	19		37.73			36.3 W
	25		37.72			35.1 E

135. 42 μ *Hydrae**.

1885.						
Dec.	1	10 20	31.68	—16	14	58.1 E
	2		31.68			58.0 E
	18		31.69			58.7 W
	19		31.68			59.3 W
	25		31.74			58.7 E

136. BRADLEY 1463.

1885						
Dec.	1	10 25	13.31	—,7	2	53.6 E
	2		13.36			53.2 E
	18		13.29			52.8 W
	19		13.33			52.7 W
	25		13.37			53.2 E

137. 44 *Hydrae*.

1885.						
Dec.	1	10 28	32.72	—23	9	10.9 E
	2		32.72			11.2 E
	18		32.64			9.2 W
	19		32.66			9.7 W
	25		32.77			11.0 E

138. φ *Hydrae* 24 HEV.

1885.						
Dec.	1	10 32	58.75	—16	16	47.9 E
	2		58.75			47.8 E
	18		58.78			48.6 W
	19		58.68			46.9 W
	25		58.74			47.2 E

139. 33 *Sextantis**.

1885.						
Dec.	1	10 35	33.15	— 1	8	15.5 B
	2		33.13			15.4 B
	18		33.11			14.8 W
	19		33.14			14.4 W
	25		33.13			.... E

140. ν *Hydrae*.*

1885.							
Dec. 25	10	48	57.01	-15	35	33.2	E

141. 41 *Sextantis*.

1885.									
Dec.	1	10	44	31.92	—	8	17	20.7	E
	2			31.95				20.5	E
	18			31.81				20.1	W
	19			31.80				19.3	W

142. b^2 *Hydrae*.

1885.							
Dec. 1	10	47	51.93	-19	31	12.5	E
2			51.94			11.5	E
18			51.90			12.1	W

143. 61 p^2 *Leonis*.

1885.									
Dec.	1	10	55	57.69	—	1	51	57.5	E
	2			57.72				57.1	E
	18			57.70				56.5	W
	19			57.68				57.3	W
	25			57.66				58.2	E

 χ *Leonis*.*

1885.								
Dec. 2	10	59	5.07	+	7	57	26.9	E
18			5.12				26.7	W
19			5.06				26.4	W
25			5.06				26.0	E

 π *Cephei*.* S.P.

1885.							
Dec. 1	23	4	14.51	+74	45	....	E
2			14.53			....	E
18			14.83			....	W
19			14.50			....	W
25			14.47			....	E

144. 11 β *Crateris*.*

1885.							
Dec. 1	11	6	0.14	-22	11	53.8	E
2			0.20			54.2	E
18			0.10			53.8	W
19			0.13			53.6	W
25			0.12			53.9	E

 θ *Leonis*.*

1885.							
Dec. 18	11	8	12.32	+16	3	....	W
19			12.27			28.9	W

145. 74 φ Leonis.

1885.								
Dec.	1	11	10	48.86	— 3	1	24.1	E
	2			48.89			23.5	E

146. 12 δ Crateris.*

1885.								
Dec.	1	11	13	35.43	—14	9	23.4	E
	2			35.43			23.0	E
	25			35.47			23.7	E

147. 15 γ Crateris.*

1885.								
Dec.	1	11	19	8.19	—17	3	10.2	E
	2			8.20			9.2	E

148. 16 k Crateris.

1885.								
Dec.	1	11	21	21.92	—11	43	30.0	E
	2			22.01			29.5	E

149. 27 ϵ Leonis.

1885.								
Dec.	1	11	24	26.31	—2	23	9.9	E
	2			26.35			8.9	E

150. 21 θ Crateris.

1885.								
Dec.	1	11	30	50.92	—9	9	58.3	E
	2			50.92			59.1	E

 γ Cephei,* S. P.

1885.								
Dec.	1	23	34	38.08	+76	59	....	E
	2			38.24			....	E

151. 27 ζ Crateris.

1885.								
Dec.	1	11	38	56.06	—17	42	41.9	E
	2			56.05			41.7	E

152. 5 β Virginis.*

1885.								
Dec.	21	11	44	42.29	+2	24	45.7	E
				42.32			45.6	E

ERRATA IN VOL. IV.

- Page 7. February 25, circle reversed *after* 1.^h 6.
 28. Circle reversed on October 24, instead of October 28.
 72. Fourth line from top *dele* ? after 46.
 95, 96. The observations of AUWERS 1, 2 and 3, which were made on January 2, 8 and 9, 1885, are reduced to 1884.0 and not to 1885.0 as indicated.
 109. Under 19 *Canis Majoris*, insert 1885.
 116. P., VII^h 167. for VII^h read VIII^h.
 118. σ^2 *Ursæ Majoris*, S. P. declination is $+67^\circ$ instead of -67° .
 119. 83 *Canceri* insert \pm before degrees of declination.
 123. For 140. *Hydrae* 25 HEV., read 140. ν *Hydrae* 25 HEV.
 128. Under 9 β *Corvi*, read May 8, 10, 26, etc.
 129. 40 ϕ *Virginis*, transfer : x to observation of May 13.
 134. Under α *Draconis*, S. P. for 1884, read 1885.
 136. Under M. 575, read May 10 and 13.
 136. 109 *Virginis*, observation of June 7, 1894, for 22.04, read 23.04
 138. 11 *Ursæ Minoris*, S. P. declination is $+72^\circ$ instead of -72° .
 141. 32 μ *Serpentis*, observation of June 5, for 26.7, read 26.8.
 145. For 31 ζ *Ophiuchi*, read 13 ζ *Ophiuchi*.
 155. B. A. C. 6224, observation of July 11, for 30.0, read 30.9.
 166. ε *Draconis*, observation of July 20, for 23.65, read 33.65.
 195. Total movement of wind, for 7935, read 7035.
 202. Mean relative humidity for November, for 84.3, read 84.7.
 202. Total movement of wind for March, for 0488, read 9488.



